Information sheet for environmental audits and preliminary risk screen assessments (PRSAs)

Publication 2009 June 2021

Victoria's audit system

An environmental audit system has operated in Victoria since 1989. The *Environment Protection Act 2017* (the Act) provides for the appointment of environmental auditors. It also provides for Environment Protection Authority (EPA or the Authority) to have a system of preliminary risk screen assessments (PRSAs) and environmental audits. These are used in the planning, approval, regulation and management of activities, and in protection of human health and the environment.

Under the Act, the functions of an environmental auditor include to:

- conduct PRSAs and environmental audits
- prepare and issue PRSA statements and reports, and environmental audit statements and reports.

The purpose of a PRSA is to:

- assess the likelihood of the presence of contaminated land
- determine if an environmental audit is required
- recommend a scope for the environmental audit if an environmental audit is required.

The purpose of an environmental audit is to:

- assess the nature and extent of the risk of harm to human health or the environment from contaminated land, waste, pollution, or any activity
- recommend measures to manage the risk of harm to human health or the environment from contaminated land, waste, pollution, or any activity
- make recommendations to manage any contaminated land, waste, pollution or activity.

Upon completion, all PRSAs and environmental audits require preparation of either a PRSA statement, accompanied by a PRSA report, or an environmental audit statement, accompanied by an environmental audit report.

A person may engage an environmental auditor to conduct a PRSA or an environmental audit.

EPA administers the environmental audit system and ensures an acceptable quality of environmental auditing is maintained. This is achieved by assessing auditor applications and conducting a quality assurance program. These measures ensure that PRSAs and environmental audits that environmental auditors undertake are completed in accordance with the relevant sections of the Act or any other Act, and with the guidelines the Authority or other government agencies have published.

Environment Protection Authority Victoria
GPO BOX 4395 Melbourne VIC 3001
1300 372 842 (1300 EPA VIC) **epa.vic.gov.au**

File structures

EPA stores digital statements and reports from PRSAs and environmental audits in three parts:

- Part A, the PRSA or environmental audit report
- Part B, report appendices
- Part C, the PRSA statement and executive summary or environmental audit statement and executive summary.

Report executive summaries, findings and recommendations should be read and relied upon only in the context of the whole document, including any appendices and the PRSA statement or environmental audit statement.

Currency of PRSAs and environmental audits

PRSAs and environmental audits are based on the conditions encountered and information reviewed at the time of preparation. They don't represent any changes that may have occurred since the completion date. As it's not possible for the PRSA or audit report to present all data that could be of interest to all readers, consideration should be made to any appendices or referenced documentation for further information.

When information about the site changes from what was available at the time the PRSA or environmental audit was completed, or where an administrative error is identified, an environmental auditor may amend or withdraw PRSA or environmental audit statements and/or reports. Users are advised to check EPA's website to ensure documents' currency.

PDF searchability and printing

EPA can only provide PRSAs and environmental audit statements, reports and appendices that the environmental auditor provided to EPA via the EPA portal on the EPA website.

All statements and reports should be in a Portable Document Format (PDF) and searchable; however at times some appendices may be provided as image-only PDFs, which can affect searchability.

The PDF is compatible with Adobe Acrobat Reader, which is downloadable free from Adobe's Website (www.adobe.com).

Further information

For more information on Victoria's environmental audit system, visit EPA's website or contact EPA's Environmental Audit Unit.

Web: www.epa.vic.gov.au

Email: environmental.audit@epa.vic.gov.au

EPA VICTORIA

Mr Steven Frazer

Preliminary Risk Screen Assessment

Under Part 8.3 of the Environment Protection Act 2017

132-134 Park Street Fitzroy North Vic

12 July 2021

FINAL REPORT

Salient+
GeoEnvironmental Advisory

Report	Details
Status	Final
Prepared for	Mr Steven Frazer
Project	Preliminary Risk Assessment
Subject Site	132-134 Park Street Fitzroy North Victoria
Reference No.	NA
Date of Issue	12 July 2021
Prepared by	Salient GeoEnvironmental Consulting Pty Ltd ABN 81 631 337 678 PO BOX 515 Camberwell Vic Australia 3124 Tel +61 (0)419 209 690

For and on behalf of
Salient GeoEnvironmental Consulting Pty Ltd

Warren Pump
Environmental Auditor

Principal/Director

Date: 12 July 2021

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(Cover photo courtesy of Google Earth)

Table of Abbreviations

ABBREVIATION	DEFINITION
ACL	Added Contaminant Limit
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
ASC NEPM	*National Environment Protection (Assessment of Site Contamination) Measure 1999*, as amended 2013
ASLP	Australian Standard leaching procedure
B(a)P	Benzo(a)pyrene
BTEX	Benzene, toluene, ethylbenzene and xylenes
COC	Chain of Custody
COPC	Contaminant of Potential Concern
CUTEP	Clean up of groundwater to the extent practicable
CSM	Conceptual Site Model
DO	Dissolved Oxygen
DQI	Data Quality Indicator
DQO	Data Quality Objective
DSI	Detailed Site Investigation
EC	Electrical Conductivity
Eh	Oxidation/Reduction Potential
EIL	Ecologically-based Investigation Levels
ESL	Ecological Screening Level
EPA	Victorian Environment Protection Authority
ESA	Environmental Site Assessment
GDA94	Geocentric Datum of Australia 1994
GWQO	Groundwater Quality Objective
HIL	Health-based Investigation Levels
HSL	Health-based Screening Level
IWRG	EPA Industrial Waste Resource Guidelines
LNAPL	Light Non-Aqueous Phase Liquids
LOR	Limit of Reporting
MAHs	Monocyclic Aromatic Hydrocarbons
mbgl	Metres below ground level
mg/kg	Milligrams per kilogram
mg/L	Milligrams per litre
ML	Management Limit
NATA	National Association of Testing Authorities
NEPC	National Environmental Protection Council
NEPM (ASC)	National Environment Protection Measure
NL	Not limiting (which means exposure pathway is not significant for this contaminant)
OCPs	Organochlorine Pesticides
OPPs	Organophosphorous Pesticides
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PID	Photo-ionisation Detector

ABBREVIATION	DEFINITION
ppm	Parts per million
PSI	Preliminary Site Investigation
QA	Quality Assurance
QC	Quality Control
RAS	Remediation Action Strategy
RPD	Relative Percentage Difference
RWP	Remediation Work Plan
SAP	Sampling and Analytical Plan
SEPP	State Environment Protection Policy
SOPs	Standard Operating Procedures
SVOCs	Semi-Volatile Organic Compounds
SWL	Static Water Level
TDS	Total Dissolved Solids
TOC	Top of Casing
TPH or TPHs	Total Petroleum Hydrocarbons
TRH	Total Recoverable Hydrocarbons
VOCs	Volatile Organic Compounds
µg/L	Micrograms per litre

Executive Summary

This report is in response to a request for a Preliminary Risk Screen Assessment in accordance with Division 2 of Part 8.3 of the *Environment Protection Act 2017*. The summary information on this audit is presented in the following table, in accordance with EPA Publication 1147.

Table E-1 Summary of Audit Information

Auditor	*Warren Pump*
Auditor account number	*EXT001047*
Date EPA Notified of Audit	*NA*
Environmental audit or PRSA Reference	*PRSA00XXXX*
Name of person requesting the Audit	*Steven Frazer*
Relationship of person requesting audit to site	*Representative of the Owner*
Name of site owner	*Frazer Property Investments Pty Ltd*
Date of auditor engagement	*1/07/2021*
Completion date of the PRSA	*12/07/2021*
Reason for PRSA	*Planning System*
Elements of the Environment Assessed	*Land, Groundwater, Surface Water*
Planning Permit No. of requirement detail if applicable	*PLN20/0210*
EPA Region	*Metro*
Municipality	*City of Yarra*
Dominant – Lot on plan	*Lot 1 TP171769*
Additional – Lot on Plan (s)	*Lot 2 TP171769; Lot 1 TP666340*
Site/ Premises Name	*-*
Building/complex sub-unit No.	*-*
Street/Lot – Lower No.	*132*
Street/ Lot – Upper No.	*134*
Street Name	*Park*
Street Type (Road, Court, etc.)	*Street*
Street Suffix (north, south, etc.)	
Suburb	*Fitzroy North*
Postcode	*3068*
Site Area (in square metres)	*218*
Plan of Site showing the PRSA site boundary attached	*Yes*

Member and Categories of Support Team Utilised	*None*
Further work or requirements	*None*
Nature and extent of continuing risk	*Risks in soil affecting Human Health and will be managed by physical capping/barriers*
Outcome of the PRSA	*PRSA Report and Statement recommending that no environmental audit be conducted*

Table E-2 Physical site information

Historical land use	Residential – lower density
Current land use	Residential – lower density
Proposed land use	Residential – lower density
Current Land Use Zoning	Mixed Use (MUZ)
Surrounding land use - north	Public Open Space
Surrounding land use - south	Residential – lower density & Residential – high density
Surrounding land use - east	Commercial and retail and Residential – lower density beyond
Surrounding land use - west	Residential – lower density
Has EPA been notified about the site under Section 40 of the Environment Protection Act 2017?	No
Nearest surface water receptor – name	Merri Creek
Nearest surface water receptor – direction	East
Site aquifer formation	Newer Volcanics basalt formation
Groundwater segment	B

Summary of Report

In the capacity of an EPA-appointed Environmental Auditor, Warren Pump of Salient GeoEnvironmental Pty Ltd has completed a Preliminary Risk Screen Assessment (PRSA) of residential land at 132-134 Park Street, Fitzroy North Vic 3068 pursuant to the *Environment Protection Act 2017* (the Act).

The Site: Current and Proposed Uses

The site is currently occupied and used for residential purposes, comprising a single dwelling (a semi-detached solid-brick Victorian home). Proposed renovations will entail partial demolition of the existing house and an external studio, and replacement with a new extension and associated external landscaping and paving.

The proposed renovation of the existing single semi-detached dwelling will not include any change of ground contour levels or necessitate bulk excavations.

Planning Permit Issued

As the responsible and planning authority, the City of Yarra has issued a planning permit, No. PLN20/0210 dated 22nd October 2020. The permit allows:

- *Partial demolition of an existing residential building and external studio;*
- *The alteration of the existing residence on the site*.

The site is zoned Mixed Use (MUZ) and contains a Heritage Overlay and an Environmental Audit Overlay.

Assessment Conducted by the Auditor

A PRSA is an environmental assessment that reviews information regarding the past use and activities undertaken at a site to consider the possible presence of contaminated land. Under section 204(2) of the *Environment Protection Act 2017*, the purpose of a preliminary risk screen assessment is to:

- assess the likelihood of the presence of contaminated land;
- determine if an environmental audit is required; and
- recommend a scope for the environmental audit, if an environmental audit is required.

A PRSA is not an environmental audit pursuant to section 203 of the Act and does not replace an environmental audit. The PRSA is a process to consider if an environmental audit is required, based on the likelihood of the site being contaminated land (Clause 45.03 of the current Victorian Planning Provisions, VPP). Further information on the situations where a PRSA is a recommended process in the planning framework is provided in *Planning Practice Note 30: Potentially Contaminated Land*, dated July 2021.

The PRSA follows an investigation process consistent with that of a Preliminary Site Investigation (PSI) as outlined in the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPM [ASC]).

Findings of the Assessment

With an uninterrupted use as a single dwelling semi-detached residence since at least 1990, this PRSA has shown that the land is unlikely to be contaminated with respect to the following environmental values:

- *Land dependent ecosystems and species: highly modified ecosystems;*
- *Buildings and Structures;*
- *Aesthetics; and*
- *Production of flora and fauna and fibre.*

The Auditor considers that the site is likely to be contaminated land in the context of the environmental value *Human Health*. However, an environmental audit is considered not to be required as, in accordance with Division 2 of Part 8.3 of the *Environment Protection Act 2017* and the EPA *Guideline for Conduct of Preliminary Risk screen Assessments*, the contamination will not prevent or restrict the use or proposed land use.

The Auditor's concludes that due to:

- the continued presence of the buildings on the site; and
- the extensive decking and paving across the site (and for the proposed use),

there is no viable pathway for exposure by humans to the identified contaminants in the surface and near surface soil. The Auditor considers that no further investigation of the site is necessary.

Victorian Planning Provisions Amendment

In conducting the PRSA, and considering the proposed future use of the site and the findings of a 2021 preliminary site investigation (PSI), the Auditor has also had regard to Amendment VC203 (1st July 2021) of the VPP. In particular, the Auditor acknowledges that amendments to the *Environmental Audit Overlay*, to ensure that land is suitable for sensitive land uses such as dwellings, includes new exemptions for buildings and works that do not disturb the soil. In this respect, Clause 45.03 of the current VPP states that:

The requirement *for a preliminary risk screen assessment statement or an environmental audit statement in this provision does not apply to the construction or carrying out of buildings and works if:*

- *The buildings and works are associated with an existing sensitive use, secondary school or children's playground, in Clause 62.02-1 or 62.02-2, and the soil is not disturbed;*
- *……..*

Auditor's Conclusions

The Auditor is satisfied that the sensitive use of the site, continuing as a single dwelling semi-detached residence, and proposed building works involving the partial demolition of existing buildings and construction of a house extension, will involve no material disturbance of soils at the site. The proposed use will not include any bulk excavations or change of ground contour levels. The new building work and hard landscaping will take place on existing ground level. Development works will not include a pool or basement/cellar structure.

In summary, based in multiple lines of evidence, the Auditor finds that no environmental audit of the site is necessary for the current use or the proposed use.

The Auditor provides the PRSA Statement shown overleaf.

Use of the PRSA Statement

The person in management or control of the site must provide a copy of the preliminary risk screen assessment statement issued in respect of a site to any person who proposes to become the person in management or control of the site (section 214 of the *Environment Protection Act 2017*).

Preliminary risk screen assessment Statement

Under Part 8.3 of the Environment Protection Act 2017

This statement is a summary of the findings of a preliminary risk screen assessment conducted under Part 8.3 of the *Environment Protection Act 2017* for:

132-134 Park Street
FITZROY NORTH Victoria 3068

Further details are provided in the preliminary risk screen assessment report that accompanies this statement.

Section 1: Preliminary risk screen assessment overview

Environmental auditor details

Name:	Warren Pump
Company:	Salient GeoEnvironmental Consulting Pty Ltd
Address:	PO Box 515, Camberwell Vic 3124
Phone:	0419 209 690
Email:	warren@salientplus.com

Site owner/occupant

Name:	NA
Company:	Frazer Property Investments Pty Ltd

Environmental auditor engaged by

Name:	Mr Steven Frazer
Company:	NA
Relationship to site owner:	Representative of the Owner

Reason for preliminary risk screen assessment

Planning scheme:	Environmental Audit Overlay
Other:	NA

Section 2: Assessment scope

Site details

Address:	132-134 Park Street, Fitzroy North Victoria 3068
Title details:	Lot 1 TP171769; Lot 2 TP171769; Lot 1 TP666340
Area (hectares):	0.0218

☒ a plan of the site is attached

Use or proposed use assessed

☒ Sensitive use (including land used for residential use, a child care centre, pre-school, or primary schools) and secondary schools and children's playgrounds – other (lower density)

☐ Sensitive use (including land used for residential use, a child care centre, pre-school, or primary schools) and secondary schools and children's playgrounds – high density

☐ Recreation/open space

☐ Parks and reserves

☐ Agricultural

☐ Commercial

☐ Industrial

☐ Other

Environmental elements assessed

☐ Ambient air

- ☐ all environmental values were considered **OR**
- ☐ all environmental values other than the following were considered:

☐ Ambient sound

- ☐ all environmental values were considered **OR**
- ☐ all environmental values other than the following were considered:

☒ Land

- ☒ all environmental values that apply to the land use category were considered **OR**
- ☐ all environmental values that apply to the land use category, other than the following, were considered:

☐ Water

- ☐ Surface water
  - ☐ all environmental values that apply to the applicable segment were considered **OR**
  - ☐ all environmental values that apply to the applicable segment, other than the following, were considered:

☒ Groundwater

- ☒ all environmental values that apply to the applicable segment were considered **OR**
- ☐ all environmental values that apply to the applicable segment, other than the following, were considered:

Standards considered

Environment Reference Standard 2021
National Environment Protection (Assessment of Site Contamination) Measure 1999

Assumptions made during the assessment or any limitations

None

Exclusions from the assessment and the rationale for these

The PRSA excludes any buildings or other structures permanently affixed to the land, as such features at the subject site are not relevant to the assessment of potential contamination of the land

This statement is accompanied by the following preliminary risk screen assessment report

Title:	Preliminary Risk Screen Assessment - 132-134 Park Street, Fitzroy North Victoria
Report no:	R01
Date:	12 July 2021

Section 3: Assessment outcome

Based on my assessment, I am of the opinion that an environmental audit is **not required** for the following land uses, **including** the use or proposed use for which the site has been assessed:

- ☒ Sensitive use (including land used for residential use, a child care centre, pre-school, or primary schools) and secondary schools and children's playgrounds – other (lower density)
- ☒ Sensitive use (including land used for residential use, a child care centre, pre-school, or primary schools) and secondary schools and children's playgrounds – high density
- ☐ Recreation/open space
- ☐ Parks and reserves
- ☒ Agricultural
- ☒ Commercial
- ☒ Industrial
- ☐ Other

Other information

Groundwater at the site contains concentrations of inorganic substances (including metals). The levels are considered typical of the natural groundwater quality surrounding the site and do not constitute contamination in accordance with clause 16(3)(b) of *Environmental Reference Standard 2021*.

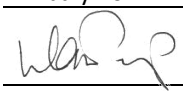
Note: An assessment that an audit is not required does not include any judgement as to whether responsibilities under section 39 of the *Environment Protection Act 2017* (duty to manage contaminated land) exist for the person in management or control of the land. Please refer to EPA publication 1977, *Assessing and controlling contaminated land risks: A guide to meeting the duty to manage for those in management or control of land* (https://www.epa.vic.gov.au/about-epa/publications/1977).

Section 4: Environmental auditor's declaration

I state that:

- I am appointed as an environmental auditor by the Environment Protection Authority Victoria under the *Environment Protection Act 2017*.
- The findings contained in this statement represents a true and accurate summary of the findings of the preliminary risk screen assessment that I have completed.

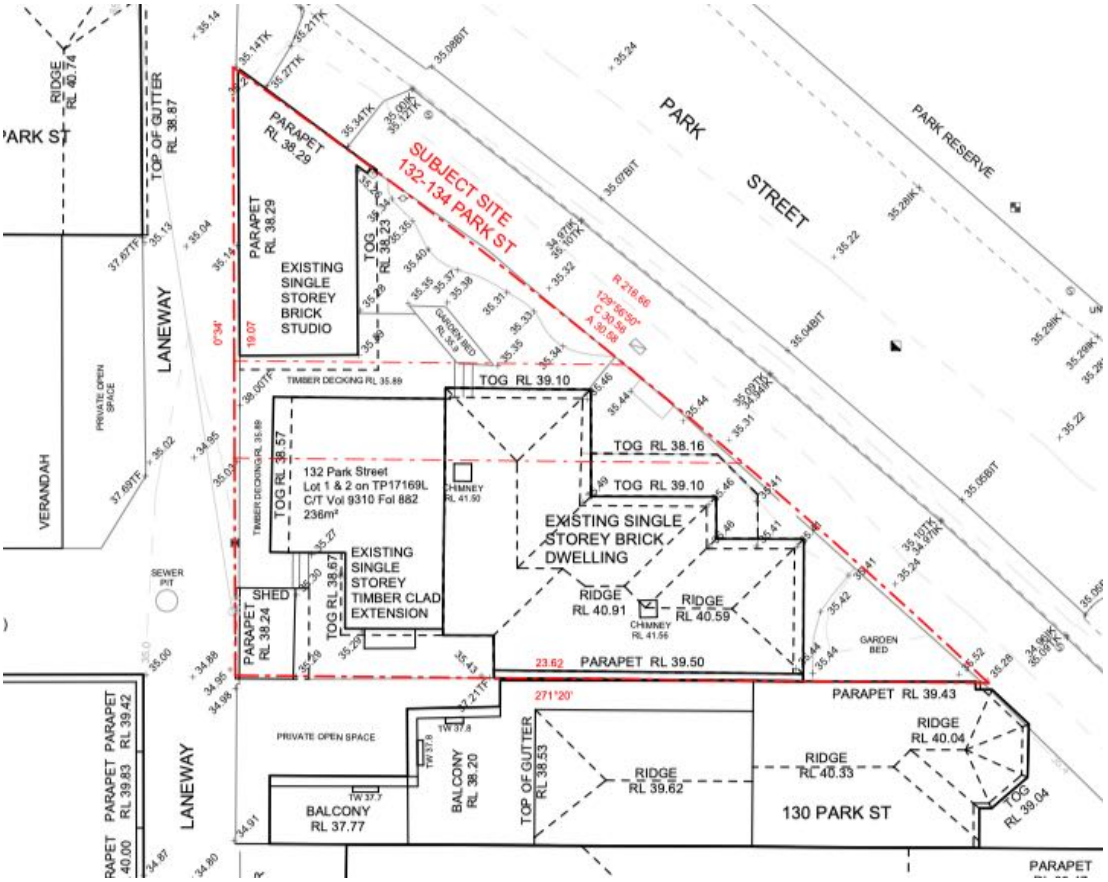
Date: 12 July 2021

Signed: 

Name: Warren Pump
Environmental Auditor

Attached: Site Plan

Site at 132-134 Park Street, Fitzroy North Victoria 3068



1 Introduction

1.1 Background

This Preliminary Risk Screen Assessment (PRSA) Report has been prepared by Warren Pump of Salient GeoEnvironmental Consulting Pty Ltd, regarding the land located in 132-134 Park Street, Fitzroy North, Victoria ('site'). The PRSA has been conducted at the request of the owner of the site, Mr Steven Frazer (hereafter referred to as 'the client').

The PRSA has been conducted in accordance with Division 2 of Part 8.3 of the *Environment Protection Act 2017* (the Act) and the *Guideline for Conduct of Preliminary Risk screen Assessments,* published by the Environment Protection Authority (EPA) in July 2021. The Auditor has exercised professional judgement with reference to the Victorian *Environment Reference Standard*, the *Environment Protection Regulations* and national and state environmental guidelines, where relevant.

1.2 Purpose of Report

A PRSA is an environmental assessment that reviews information regarding the past use and activities undertaken at a site to consider the presence of contaminated land.

The PRSA follows an investigation process consistent with that of the existing Preliminary Site Investigation (PSI) outlined in the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPM [ASC]).

Under section 204(2) of the Act, the purpose of a preliminary risk screen assessment is to:

- assess the likelihood of the presence of contaminated land;
- determine if an environmental audit is required; and
- recommend a scope for the environmental audit, if an environmental audit is required.

A PRSA results in a PRSA statement and a PRSA report prepared by the environmental auditor.

A PRSA is not an environmental audit pursuant to section 203 of the Act and does not replace an environmental audit. The PRSA is a process to consider if an environmental audit is required, based on the likelihood of the site being contaminated land.

If the outcome of the PRSA is that an environmental audit is required, then the audit process would assess the nature and extent of the risk of harm to human health or the environment from the contaminated land and make recommendations for measures to manage any identified risks of harm, as well as recommendations to manage the contaminated land.

Further information on the regulatory context of a PRSA is provided in Section 2 of this report.

This report by Salient GeoEnvironmental must be read and used in recognition of the limitations set out in Section 12.

1.3 Auditor Support Team

The Environmental Auditor has relied upon his own expertise in contaminated land to assess the risks of any contamination of land at the subject site. Warren Pump is the principal author of this report.

1.4 Parties involved

A list of parties involved in the audit is outlined in Table 1-1 below.

Table 1-1 - Relevant Parties

Site Owner(s):	Frazer Property Investments Pty Ltd
Site Occupier(s):	Not Known
Environmental Site Assessor(s):	iEnvironmental Pty Ltd
Primary Laboratory Used by Assessor(s):	Eurofins Environment Testing Australia Pty Ltd (Eurofins)
Secondary Laboratory Used by Assessor(s):	NA

1.5 Professional Judgement Exercised

The reader of this report is cautioned that the assessment and remediation of environmental impact is an emerging science. The technology associated with assessment and risk mitigation of land contamination is constantly changing as scientific information on data collection, risk assessment, toxicology and remediation technologies are published.

The reader is advised that the Auditor has considered these aspects and exercised professional judgement regarding the impact on the subject site. This is discussed further in Section 2.4 below.

1.6 Structure of this Report

This report contains the following information:

- An explanation of preliminary risk screen assessments and the role of the auditor (Section 2).
- The scope and methodology of the PRSA as applied to the subject site (Section 3).
- A detailed description of the site (Section 4).
- As assessment of the history of use of the site and its environs, and outline of its topography, geology and hydrogeology (Sections 5 and 6).
- An explanation of the Environmental Values of the land and waters relevant to the site and development of a Preliminary Conceptual Site Model (Sections 7 and 8).
- A review of the Site Investigations conducted at the site (Section 10).
- A detailed interpretation of the likelihood of site contamination and the need or otherwise of an environmental audit (Section10).
- The Auditor's conclusions about the PRSA (Section 11).

Having regard to Appendix C of the EPA guidance in preliminary risk screen assessments (July 2021), this PRSA report also contains the following information:

Table 1-2 – Contents of this PRSA Report

Item No.	Information Assessed	Location in Report
1	An executive summary, that includes the table of information outlined in EPA Publication 1147	Page PRSA-1
2	Details of the site assessed (e.g. address and property title details)	Sections 4.1 & 4.2
3	The elements of environment assessed	Section 7
4	Land zoning information	Section 4.2.2
5	Completion date of the PRSA Statement and Report	Page ES-1
6	Background on why the PRSA is being undertaken	Section 4.5.1
7	Details of the scope and methodology for the PRSA, including whether the PRSA has considered land uses that are existing or proposed	Section 3
8	Summary of historical land use activities	Section 5
9	Site inspection observations and information on contamination that is present or is likely to be present	Section 4.3
10	List of documentation reviewed	Section 3.5
11	An opinion on the quality and completeness of prior assessment(s) of the site, including details of investigator, laboratory, sampling and analytical methods and type of assessment undertaken (if applicable)	Section 1.4 & 9
12	Description and outline of the initial conceptual site model with consideration of potential source - receptor - pathway linkages	Section 8
13	Assessment of the condition of the site, including: • the likelihood of contamination based on the PSI level of assessment undertaken • if sampling was undertaken, a comparison of any site-specific sampling data against relevant screening criteria • assessment of possible impacts on environmental values associated with the use or proposed use of the site	 Section 10.3 Section 9.2 & Annex A Section 10
14	Determination of whether an environmental audit is required, providing justification as to why an environmental audit was or was not required. Also: • if an environmental audit is required, the environmental auditor must provide an environmental audit scope • where an environmental audit is required, consider the need to graphically present on a site plan the area(s) of concern or those that require further assessment • comment on the presence of, or potential for, offsite contamination	Section 10.7 NA NA Sections 5.7, 9.4 & 10.5

Item No.	Information Assessed	Location in Report
15	Details of involvement of the environmental auditor's support team in the conduct of the PRSA	Section 1.3
16	Any other pertinent details of the PRSA, including: • the standards and guidelines considered; • any assumption or limitations made; • any exclusions from assessment, including environmental values.	Section 2 & 3
17	The Auditor's opinion on the environmental consultant's conclusions, as set out in the PSI report.	Section 9.3

2 PRSA Guidelines

2.1 Preliminary Risk Screen Assessments

2.1.1 Regulatory Context

Development of land provides an opportunity to address contamination and mitigate any risks posed to human health, the environment, and building and structures. Contaminated land can often be safely used and developed following appropriate remediation, provided any necessary controls to manage residual contamination are implemented.

In the Auditor's summary review below of the current planning policy concerning potentially contaminated land, the Auditor has had regard to Amendment VC203 (1st July 2021) of the *Victoria Planning Provisions* (VPP).

The requirements in the planning framework to conduct a PRSA are addressed in *Ministerial Direction No. 1 – Potentially Contaminated Land and in Environmental Audit Overlays* (MD No.1) which are applied under the VPP. Further detail on the situations where a PRSA is a recommended process in the planning framework is provided in *Planning Practice Note 30: Potentially Contaminated Land*, dated July 2021. A PRSA will assess the likelihood of the presence of contaminated land on a site.

'**Land'** is defined in section 6 of the Act and means any land, whether publicly or privately owned, and includes any buildings or other structures permanently affixed to the land, and groundwater. This means that when the auditor is considering contamination of land, they also must consider groundwater.

'**Potentially contaminated land**' is defined in the *Ministerial Direction No 1* (MD No 1) and Clause 73.01 General Terms of the *Victoria Planning Provisions* (VPP) and means land;

- Used or known to have been used for industry or mining;
- Used of known to have been used for the storage of chemicals, gas, wastes or liquid fuel (other than minor above ground storage that is ancillary to another use of the land);
- Where a known past or present activity or event (occurring on or off the land) may have caused contamination on the land.

A '**Preliminary risk screen assessment**' is an assessment used to assess the likelihood of the presence of contaminated land, to determine if an environmental audit is required and if an environmental audit is required to recommend a scope for the environmental audit (section 204 of the Act).

2.1.2 Use of a PRSA by a Planning Authority

Section 12 of the *Planning and Environment Act 1987* requires a planning authority, when preparing a planning scheme or planning scheme amendment to 'take into account any significant effects which it considers the scheme or amendment might have on the environment or which it considers the environment might have on any use or development envisaged in the scheme or amendment'.

A planning authority must also consider the Planning Policy Framework of the VPP, including clause 13.041S *Contaminated and potentially contaminated land*. Clause 13.04 -1S aims to ensure that contaminated and potentially contaminated land is or will be suitable for its intended future use and development, and that this land is used and developed safely.

2.1.3 Land Uses Considered

MD No. 1 contains more specific requirements for land which is determined to be potentially contaminated. Additional requirements apply for land proposed to be used for sensitive uses, defined as residential uses, child care centres, kindergartens, pre-school centres or primary schools, even if ancillary to another use, and for secondary schools and children's playgrounds. Where an amendment allows these uses (whether or not subject to a permit) a process under the environmental audit system, administered by the Environment Protection Authority (EPA), is required to demonstrate that the land is suitable for its intended use.

Where land has been determined to be potentially contaminated, but it is difficult or inappropriate to meet environmental audit system requirements at the amendment stage, the application of the Environmental Audit Overlay (EAO) to the land allows deferment of these requirements. The EAO is a mechanism provided in the VPP and planning schemes to ensure that requirements under MD No. 1 are met before the commencement of a sensitive use (or children's playground or secondary school), or the construction or carrying out of any buildings and works associated with those uses. Applying the overlay ensures the requirements will be met in the future but does not prevent the assessment and approval of a planning scheme amendment.

The presence of an EAO means a determination has already been made that land is potentially contaminated, and that a process under the environmental audit system will be required before the land is used or developed for a sensitive use, a secondary school or children's playground. Clause 45.03 *Environmental Audit Overlay* of the VPP states that before a sensitive use (residential use, child care centre, pre-school centre, primary school, secondary school or children's playground) commences or before the construction or carrying out of buildings and works in association with a sensitive use commences:

- A PRSA statement in accordance with the *Environment Protection Act 2017* must be issued stating that an environmental audit is not required for the use or the proposed use; or
- An environmental audit statement under Part 8.3 of the *Environment Protection Act 2017* must be issued stating that the land is suitable for the use or proposed use.

2.2 Exemption for Requirement of PRSA and Audit

According to Clause 45.03-1 *Environmental Audit Overlay* of the VPP, the requirement for a PRSA statement or an environmental audit statement does not apply to the construction or carrying out of buildings and works if:

- The buildings and works are associated with an existing sensitive use, secondary school or children's playground, in Clause 62.02-1 or 62.02-2, and the soil is not disturbed;
- The buildings and works are required by the Environment Protection Authority or an environmental auditor appointed under Act to make the site suitable for use; or
- The buildings and works are reasonably required by environmental auditor appointed under the Act to undertake a preliminary risk screen assessment or environmental audit.

2.3 Role of Environmental Auditor

An environmental auditor performs functions under the *Environment Protection Act 2017*, including the conduct of preliminary risk screen assessments and environmental audits. The auditor is required to have regard to guidelines and standards that ensure the environmental audit provides the best assurance available that the site is suitable for its intended use. Their primary role is to produce an independent environmental report for the site.

2.4 Auditor Independence

The Auditor, in undertaking this PRSA at the subject site, confirms stated that he is not aware of any conflict of interest which would preclude him from issuing a PRSA statement for the site and has not had prior involvement in any assessment or clean-up works at the site.

In forming his opinions and determinations, the Auditor has exercised impartiality and maintained independence from the client, its professional advisors and consultants.

2.5 Professional Judgement Exercised by the Auditor

The reader of this report is cautioned that the assessment and remediation of site contamination is an emerging science. The technology associated with assessment and remediation of site contamination is constantly changing as scientific information on data collection, risk assessment, toxicology and remediation technologies are published. In addition, assessment is based on sampling programmes that represent a common-sense balance between the costs and time associated with collection of the data against the benefits of accessing the data in question.

Site contamination assessments deal with chemical contamination of land, and seek to provide sufficient information concerning the nature, concentration and extent of such contamination to allow appropriate management decisions to be made. Such assessments also deal with natural and human-modified environments that may include multiple media such as soil, surface water, groundwater and ground gas. Each of these media may be spatially heterogeneous and also vary, either systematically or randomly, with time.

Heterogeneity and variability introduce uncertainty into any environmental assessment, making it necessary to quantify (or at least qualify) the uncertainty as well as wells as the contamination and its human or ecological impacts.

Uncertainty may be partially addressed by adopting guideline-specified standards for sampling frequency and data quality, and by applying statistical methods to define the accuracy and precision of data and to describe the central tendencies and variance of datasets. However, this does not entirely avoid the need for subjective professional or ‘expert’ judgement in making management decisions concerning the status of complex sites or the behaviour of complex environmental systems.

It is often helpful to consider multiple lines of evidence when dealing with such systems. If evaluation of independent lines of evidence leads to similar conclusions, then confidence in the validity of those conclusions is increased.

The reader is advised that the Auditor has considered these aspects and exercised professional judgement regarding the impact on the subject site.

The reader is also cautioned that characteristics of the subsurface and surface materials may vary significantly between adjacent test points, sample intervals and at locations where direct observation, measurement or exploration have not occurred.

3 PRSA Scope and Methodology

3.1 PRSA Scope

The PRSA scope has included the following:

- the site in respect of which the assessment was conducted;
- the use or proposed use for which the site is being assessed;
- the elements of the environment assessed;
- the standards considered in the assessment;
- any assumptions made by the environmental auditor during the assessment;
- any limitations on the environmental auditor's assessment; and
- any exclusions from the assessment and the rationale for these exclusions.

The PRSA scope has addressed the following:

- the current land use; and
- a proposed land use(s) consistent with the zoning of the land.

3.2 Activities at the Site

'Activities' are the current use and historical uses of the site that may have led to contamination of the land and/or groundwater at the site (including both on-site and off-site activities).

In this report, identification of activities has drawn on all available information about the site or in proximity to the site. This will include the information that has been collated for a PSI of the site (as discussed in Section 9 below), as well as the results of any site investigations or remediation work that have been previously undertaken on the site and on nearby properties.

3.3 PRSA Methodology

In conducting this PRSA, the Auditor has:

- Made a site inspection (on 2nd July 2021).
- Undertaken a review of the PSI report produced by an environmental consultant, and completion of additional enquiries or filling of information gaps if considered necessary.
- Undertaken an assessment, on the basis of the information reviewed, whether the site is likely to be contaminated land.
- Where necessary, undertaken ongoing discussion and liaison with the client and the environmental consultant.
- Determined whether further investigation of the site in an environmental audit is required to consider the risk of harm that may be posed by the contamination to the use or proposed use of the site, and if necessary recommend a scope for any required environmental audit.
- Prepared a PRSA statement and this PRSA report.

3.4 Exclusions

The PRSA excludes assessment of the structural or architectural fabric of any buildings or other structures permanently affixed to the land, as such features at the subject site are not relevant to the assessment of potential contamination of the land.

3.5 Report Reviewed

The following PSI report on the site has been reviewed and relied upon by the Auditor in undertaking this Environmental Audit:

- iEnvironmental (2021), *Preliminary Site Investigation – Fitzroy North Vic* 3068. Report prepared for Steven Frazer. Report dated 9th February 2021, Version 1.0 – Final. Reference No. 20210109

See copy of this report in Annex G of this audit report.

The Auditor has also reviewed the following desktop review and site history report, as contained in Appendix B of the iEnvironmental PSI Report:

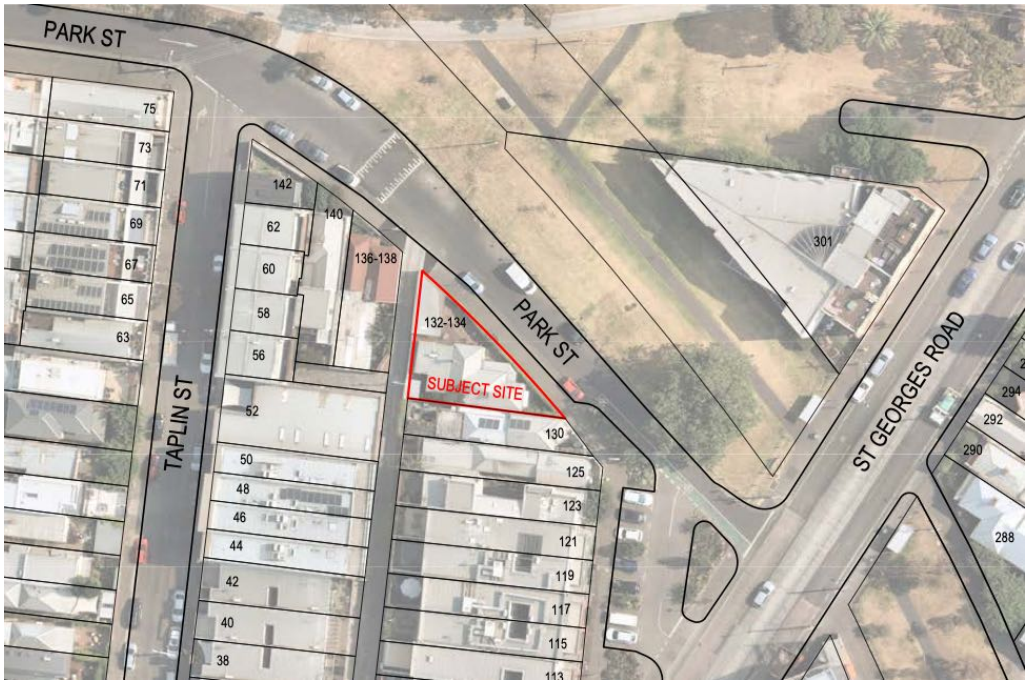
- Land Insight (2021*), Enviro-screen - 132-134 Park Street, Fitzroy North Vic.* Prepared by Land Insight and Resources Pty Ltd. Report dated 18th January 2021.

4 Site Description

4.1 Site Location and Area

The site which the subject to this PRSA is located at 132-134 Park Street, Fitzroy North 3068. The site lies approximately 3.3 km north-east of Melbourne's CBD. The site occupies 218 square metres in area and with a location as shown in Plate 4-1 below.

Plate 4-1 - Site Location



4.2 Property Description

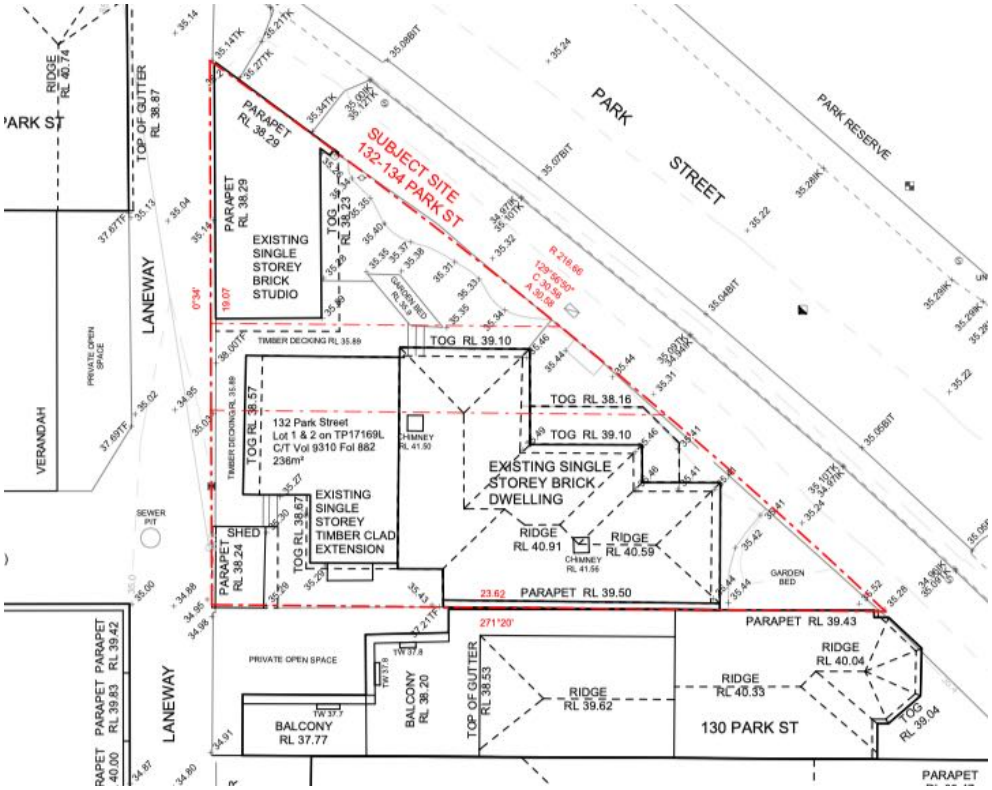
4.2.1 Certificate of Title

The legal description of the property subject to this PRSA is 1\TP171769, 1\TP666340 and 2\TP171769.

The Certificate of Title are provided in Annex B. The owner of the site is Frazer Property Investments Pty Ltd.

The layout of the existing condition of the site is shown in Plate 4-2 below.

Plate 4-2 – Existing Site Layout



4.2.2 *Land Use Zone*

According to the City of Yarra Planning Scheme:

- The site is zoned as Mixed Use MUZ.
- The property has a Heritage Overlay (HO) and Environmental Audit Overlay (EAO).

A copy of the Property Report is contained in Annex C.

The Yarra Planning Scheme states that the purpose of a MUZ is to:

- *To provide for a range of residential, commercial, industrial and other uses which complement the mixed-use function of the locality.*
- *To provide for housing at higher densities.*
- *To encourage development that responds to the existing or preferred neighbourhood character of the area.*
- *To facilitate the use, development and redevelopment of land in accordance with the objectives specified in a schedule to this zone*.

Uses permitted in MUZ include:

- Dwelling; bed and breakfast accommodation; community care accommodation; dependent person's unit; rooming house;
- Shop; home-based business;
- Agriculture; domestic animal husbandry; racing dog husbandry;

- Leisure and recreation; food and drink premises;
- Medical centre; museum; place of worship; and
- Railway or tramway; amongst others.

4.3 Site Features

4.3.1 Current Conditions

Based on the Auditor's inspection of the site, the physical condition of the site at the time of the commencement of this PRSA in July 2021 is shown in Plate 4-3 below.

Plate 4-3 – Typical Site Conditions at Commencement of PRSA

The site is currently occupied and used for residential purposes. Site features observed during the Auditor's site visit include:

- A single, solid brick Victorian era house, built some time before 1900;
- A free-standing external bedroom/studio;
- Small garden plots including brick paving and crushed rock;
- Pockets of surface fill comprising sand and clay with the garden beds (only).

The site surface was noted to be relatively flat and the approximate surface elevation is 35 mAHD.

A single-storey residential brick dwelling with a timber clad extension was observed occupying the majority of the southern portion of the site. A single-storey brick studio/bedroom was observed in the north-western corner of the site. Brick paving was present surrounding the existing dwelling and studio and a timber deck was present north and west of the existing extension.

Exposed soil within the site boundaries amounts to about 3 square metres (about 1.5% of the site area) and is contained solely with garden beds. The balance of the property is covered by the house footprint; timber decking; and crushed rock landscaping.

No waste materials apart from domestic waste for municipal collection were observed on the site.

No evidence of current chemical storage or use (or evidence of any above-ground or underground fuel storage tanks) was identified during the Auditor's site inspection. There were no electrical transformers visible on the site.

No potential asbestos-containing material (or fragments) were observed during the site inspection.

The nearest (downgradient) surface water body likely to receive surface water or groundwater from the site includes Merri Creek located approximately 500-600 m east and south-east of the site.

The current typical condition of the site is shown below in Plate 4-4.

Plate 4-4 - Current Internal Land Uses (typical)

4.4 Adjacent Site Uses

The nearby site uses are summarised in Table 4-1 below.

Table 4-1 – Adjacent Site Uses

North:	Public Open Space and High Density Residential
South:	Residential – low density and high density
East:	Residential – low density, and retail
West:	Residential – low density

The nearest sensitive receptors to the site comprise residential properties abutting the site to the south and west. Fitzroy High School is located 490m to the south-west of the site in Falconer Street. Two child-care centres are located (i) 340 m south of the site on Queens Parade, and (ii) 210 m west of the site in Rushall Crescent.

Plate 4-5 below shows the urban context of the site.

Plate 4-5 – Site Environs

(courtesy Insight, 2021)

4.5 Proposed Site Use

4.5.1 Planning Permit Issued

As the responsible and planning authority, the City of Yarra has issued a planning permit, No. PLN20/0210 dated 22nd October 2020.

In terms of proposed uses of the site, the permit allows:

- *Partial demolition of an existing residential building and external studio;*
- *The alteration of the existing residence on the site*.

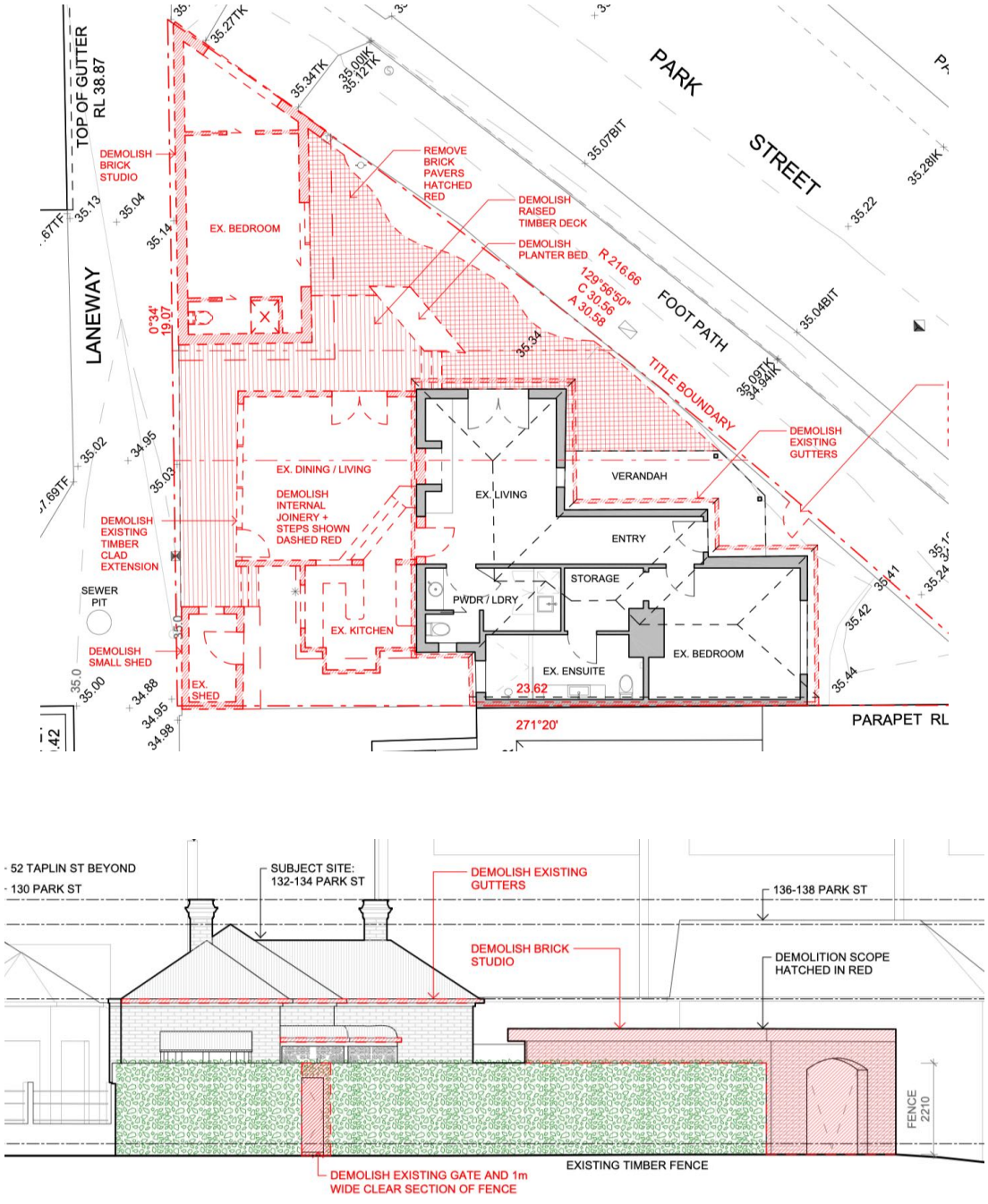
The site is located within an Environmental Audit Overlay. Pursuant to Clause 45.03 of the Yarra Planning Scheme, the Permit states that the requirements of the Environmental Audit Overlay must be met prior to the commencement of development permitted under the permit.

A copy of the above planning permit is contained in Annex D of this audit report.

4.5.2 Layout of Proposed Uses

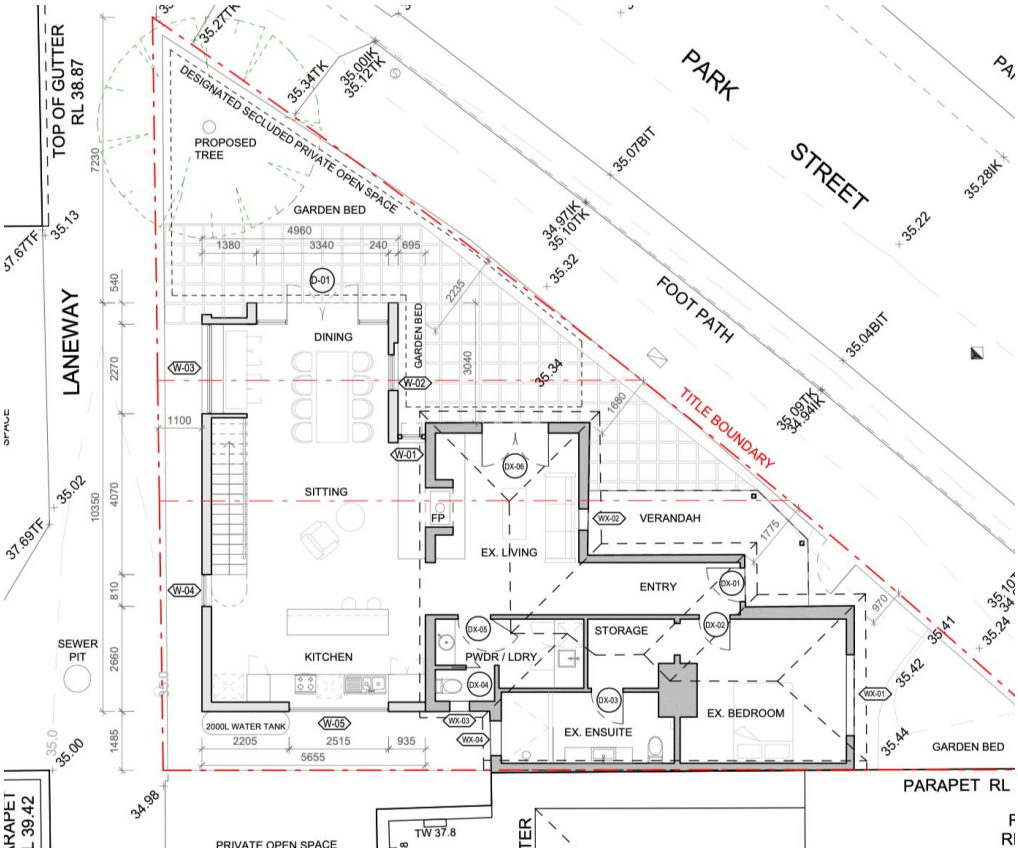
The Auditor has been advised that client intends to modify (for the purposes of renovation) the existing residential use (i.e. a semi-detached single dwelling). The proposed extent of demolition of shown in Figure **4-1** below.

Figure 4-1 - Proposed Extent of Demolition (shown in red)



The modified residential use of the site is shown in Figure 4-2 below.

Figure 4-2 - Proposed Form of Future Site Use (plan view)



The proposed renovation of the existing single semi-detached dwelling will not include any change of ground contour level or bulk excavations. The new building work and hard landscaping will take place on existing ground level. Development works will not include a basement/cellar structure.

The current and proposed use of the site includes a paved, private courtyard but no scope for a yard, lawn, pond, swimming/spa pool, or home production of fruit or vegetables. The existing use of the site, the proposed development (construction) works and the ongoing occupation of the site do not involve direct contact with groundwater beneath the site or any extractive use of the groundwater.

Only the northern corner will contain small garden plot, totalling about 15 square metres. Approximately 93% of the site area will be covered either by building slabs or hard paved areas such as stone paving.

Architectural drawings showing typical layouts of proposed townhouses across the site are attached in Annex E of this PRSA report.

5 Site History

5.1 Summary of Site Uses

A desktop review of various documents and records was undertaken to determine the historical use of the site and surrounding area and in particular to identify activities with the potential to result in potential contamination of the underlying soil and/or groundwater (Land Insight, 2021 – See Appendix B of the iEnvironmental PSI report as contained in Annex G of this PRSA report).

The following sources of historical information was accessed:

- Historical aerial photograph review;
- Sand and MacDougal directory records;
- Existing environmental audit reports of nearby sites;
- Groundwater databases held by the State Government Victoria - Department of Environment, Land, Water & Planning;
- Publicly available historical records including Commonwealth, State and local heritage records;
- EPA licences, approval and priority site registers;
- Desktop physical information review;
- Previous reports.

5.2 Historical Aerial Photography

Information on the site use and the surrounding land were obtained from aerial photographs, reviewed by iEnvironmental (2021). The aerial photographs are contained within Appendix B of the iEnvironmental PSI report (as contained in Annex G of this PRSA report). The Auditor's assessment is summarised in Table 5-1 below.

Table 5-1 - Summary of Aerial Photographs

Date	Site Use Details
1931 - 1940	Although aerial photos are not clear, the Auditor infers that the site is occupied by the existing Victorian-era solid brick house. Low density residential dwellings were present surrounding the site east, west and south of the site, with Janet Millman Reserve present immediately north.
1940 - 1950	No significant changes since 1931.
1950 - 1960	No significant changes since 1931.
1960 - 1980	No significant changes since 1931. Bulk grain silos were observed within North Fitzroy Goods Yard, immediately north of Jane Millman Reserve.
1980-1990	No significant changes since 1931. Brick studio observed within the northwestern corner of the site.
1990 - 2000	No significant changes since 1931.

Date	Site Use Details
2000 - 2010	No significant changes since 1931. Bulk grain silos no longer visible within North Fitzroy Goods Yard
2010 - 2021	No significant changes since 1931.

5.3 Historic and Current Nearby Business Premises

Th desktop study report by Land Insight (2021) advises that over the period from about 1935 through to about 1975, the subject site housed a brush and broom manufacturing company. Given the relatively small size of the site, and also of the existing Victorian-era house, this manufacturer could be best described as cottage industry. Activities associated with a brush and broom manufacturing are considered to represent a low risk of causing site contamination.

Land Insight (2021) also provided the following details of nearby business premises known to have operated (or are still operating) and could be considered as potentially contaminating activities:

Table 5-2 - Business Directory Records

National Liquid Fuel Facilities

Site name	Owner	Location	Type	Distance (m)	Direction
BP North Fitzroy	BP	269-273 St Georges Rd, Fitzroy North VIC 3068	Petrol Station	69	South
Ampol Fitzroy	Ampol	262-270 St Georges Rd, Fitzroy North VIC 3068	Petrol Station	141	south

National Waste Management Facilities

Site name	Status	Class	Type	Distance (m)	Direction
Thomas Kidney Reserve	Closed	Domestic and General Waste. Putrescible waste	Victoria Landfill Register	306	east

The Auditor considers that each of the above uses represent potentially contaminating activities.

Also listed below are other trades and commercial activities that historically took place within 150 metres of the site.

1900 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Carriage & Coach Builders, & Dealers	Roach & Boardman	119 FERGIE STREET FITZROY NORTH 3068	address	20.6	south
Cemeteries & Crematoriums	Roach & Boardman	119 FERGIE STREET FITZROY NORTH 3068	address	20.6	south
Book Manufacturers	Brake David	30 TAPLIN STREET FITZROY NORTH 3068	address	61.4	south-west
Carriage & Coach Builders, & Dealers	White G	269-273 ST GEORGES ROAD FITZROY NORTH 3068	address	64.5	south
Nurseries - Retail	Wild. Mrs Agnes	94 BEST STREET FITZROY NORTH 3068	address	79.2	south-west
Coal & Wood Yards	Ellis Thos	298 ST GEORGES ROAD FITZROY NORTH 3068	address	89.6	north-east
Merchants - Produce Salesmen & Dealers	Ellis Thos	298 ST GEORGES ROAD FITZROY NORTH 3068	address	89.6	north-east
Grocers & Provision Dealers	Fames C. W	300 ST GEORGES ROAD FITZROY NORTH 3068	address	89.9	north-east
Dairymen	Snowden O. D	160-162 PARK STREET FITZROY NORTH 3068	address	110.6	north-west
Poultry & Egg Farmers & Dealers	Gough, Mrs E.	257-261 ST GEORGES ROAD FITZROY NORTH 3068	address	111.3	south-west
Bootmakers & Dealers	Gough J	257-261 ST GEORGES ROAD FITZROY NORTH 3068	address	113.3	south-west
Bootmakers & Dealers	Jackson J	103 BEST STREET FITZROY NORTH 3068	address	115	south-west
Contractors	Brisbane Wm	95 BEST STREET FITZROY NORTH 3068	address	116.1	south-west
Dairymen	Cowling Hy	81 BEST STREET FITZROY NORTH 3068	address	126.4	south-west
Milliners	Williams Miss	62 BEST STREET FITZROY NORTH 3068	address	131.6	south-west
Laundries	Brunton. Mrs M	305-307 ST GEORGES ROAD FITZROY NORTH 3068	address	136.9	north-east
Bootmakers & Dealers	Beecroft S. W	305-307 ST GEORGES ROAD FITZROY NORTH 3068	address	139.3	north-east
Merchants - Produce Salesmen & Dealers	Devlin. Fredk	170 PARK STREET FITZROY NORTH 3068	address	141	north-west
Electric Meters & Calibrators	Hoiiie Mackey & Co	251-255 ST GEORGES ROAD FITZROY NORTH 3068	address	147.1	south-west
Electric Meters & Calibrators	Mackey T. H	251-255 ST GEORGES ROAD FITZROY NORTH 3068	address	147.1	south-west
Grocers & Provision Dealers	Thompson L & Co	176 PARK STREET FITZROY NORTH 3068	address	149.7	north-west

1915-1925 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Wheelbarrows	Roach & Boardman	121 FERGIE STREET FITZROY NORTH 3068	address	16.6	south
Coach & Carriage Builders & Dealers	Roach & Boardman	115 FERGIE STREET FITZROY NORTH 3068	address	31.6	south
Coach & Carriage Builders & Dealers	White. G	269-273 ST GEORGES ROAD FITZROY NORTH 3068	address	64.5	south
Hay & Corn Merchants	Brailsford S. J.	286 ST GEORGES ROAD FITZROY NORTH 3068	address	65.5	south-east
Tallow Merchants	Braisford S. J.	286 ST GEORGES ROAD FITZROY NORTH 3068	address	65.5	south-east
Cigarette Makers	White, G.	269-273 ST GEORGES ROAD FITZROY NORTH 3068	address	77.6	south
Coach & Carriage Builders & Dealers	White, G.	269-273 ST GEORGES ROAD FITZROY NORTH 3068	address	77.6	south
Electrical Contractors	Loxton S. L.	298 ST GEORGES ROAD FITZROY NORTH 3068	address	89.6	north-east
Boat & Sail Schools & Training	Gough, J.	257-261 ST GEORGES ROAD FITZROY NORTH 3068	address	113.3	south-west
Carpenters & Joiners	Calvert, D.	101 BEST STREET FITZROY NORTH 3068	address	115	south-west

The Auditor has reviewed the above information and similar lists in the desktop report by Land Insight (2021). The Auditor considers that none of the historical occupations listed as being nearby the subject site over the period of 1900 to 2015 could be considered as being potential sources of significant contamination of land.

5.4 Waste Management Facilities near the Site

Land Insight undertook a search of records of licensed waste disposal facilities near the site and found one within 500m of the site (see Table 5-2 above).

This area has been specifically identified by the Auditor as the western side of Merri Creek, at the eastern end of Holden Street, Fitzroy (Thomas Kidney/Rushall Reserve). The Auditor considers that the Reserve lies about 460m east of the subject site. Based on other enquiries by Auditor in 2021 (EPA Ref. SON 8006842), buried fill at the Reserve is known to be municipal waste.

The presence of potential buried wastes at or near the subject site, and the possible presence of subsurface landfill gas, has been taken into account by the Auditor in Section 10.1 below of this audit report.

5.5 EPA Priority Sites Register

A search of the Priority Sites Register held by the Victorian EPA, version dated 31st May 2021, indicated that the subject site is not listed on the EPA Priority Sites Register. The Register reported that no Clean-up or Pollution Abatement Notice had been issued to owners or occupiers of the site.

The Priority Sites Register lists sites for which EPA has requirements for active management of land and groundwater contamination (EPA Publication 735 EPA *Contaminated Site Information Systems Priority Sites Register,* December 2000). Necessary clean-up and management of contaminated sites is an EPA priority, and so “Clean Up’ or ‘Pollution Abatement’ notices are issued to occupiers/owners of such sites.

One property in Fitzroy North within a distance of 1.24km from the subject site is listed as a Priority Site:

433 Smith Street and 111-139 Queens Parade, Fitzroy North
Former Industrial Site. Requires assessment and/or clean up.
EPA Reference 0090010240

This Priority Site is known by the Auditor to be the former Fitzroy Gasworks, which is currently undergoing clean up.

It should be noted however, that the Priority Sites Register does not list all sites known to be contaminated in Victoria, and a site should not be presumed to be free of contamination if it does not appear in the Priority Sites Register. However, since the site does not exist on the EPA Priority Sites Register, no active management plan is required for the site.

5.6 Groundwater Quality Restricted Use Zones

The Auditor undertook a search of the Victorian Unearthed website to identity the locations of any Groundwater Quality Restricted Use Zones (GQRUZs) and found two such areas within a 500 metre radius of the site, as shown in Figure 5-1 below:

Figure 5-1 - Groundwater Quality Restricted Use Zones (shown in blue)

As well be discussed in more detail in Section 5.7 below, the Auditor is of the opinion that neither of these GQRUZs affect the subject site, given large separation distances and inferred groundwater flow directions.

5.7 Nearby Environmental Audits of Land

A total of 10 properties within radius of 500 metres from the site have been the subject of environmental audits as shown in as shown in Figure 5-2 below (depicted as orange dots).

Figure 5-2 – Environmental Audits of Sites within 500 metres of the Subject Site

Existing environmental audit reports (EPA Ref. CARMs 48804) nearest the site are shown as Audit Areas 1 and 2 in Figure 5-3 below, being at 111-113 Fergie Street, North Fitzroy. Reports for Audit Area 1 and 2 were completed in 2003 and 2004 respectively.

Figure 5-3 – Nearby Audit Reports

The Auditor has reviewed the outcomes of the environmental audits located within 1.4km of the site. A brief summary of the technical aspects of those audits and other nearby are provided in Table **5-3** below.

Table 5-3 - Summary of Environmental Audit Outcomes for Nearby Properties

Property Address	Date Issued	Distance w.r.t site	Former land use	Remediation Undertaken	Soil Impact	Groundwater Impact	Other Groundwater (gw) Information	Outcome
111-113 Fergie Street, North Fitzroy CARMS Ref 48804-1	June 2003	20m South	Coach manufacturing (until 1920s), followed by motor workshops and furniture polisher (until 1992) and subsequently a confectionary factory	Excavation and removal of surface fill.	In near surface fill layers: Lead (>HIL D and HIL-F), Mercury (>HIL-A), PAHs (>HIL-D HIL-F), incl B(a)P >HIL F. No elevated results reported in the underlying natural soils, however black-stained soils near TIT near northern boundary of the site (with Lead >HIL-D). Fuel odour in soil at depths >8m in SE corner of the site.	The auditor found that groundwater quality under the audit site had been impacted by off-site sources (USTs) in Audit Area 2 at the south of the site. Metals were elevated in groundwater on- and off-site (likely to be naturally occurring?). Chlorinated hydrocarbons attributed to non-site sources, but found at concentrations only slightly above detection limits.	Groundwater SWL found at 9.1m to 9.9m in variably weathered basalt rock, and flowing to SE. Audit found Segment B applies (TDS range 1,200-3,100 mg/L). Precluded BU's of groundwater include potable water (acceptable) and stock watering.	Statement of Environmental Audit with an EMP. The site must be developed to maintain a barrier over the existing soils.
111-113 Fergie Street, North Fitzroy CARMS Ref 48804-2	March 2004	40m South	Motor workshops (until 1992) and subsequently a confectionary factory	UST removal: 7 underground tanks, plus service lines to former bowser in St Georges Road. A further 2 USTs in SW corner, plus service pits and hydraulic hoists. Near surface fill also removed from site.	At former USTs: TPH at western end of the site. In near surface natural soil: metals(>EIL), Cobalt, Lead & Mercury (>HIL-A). Fuel odour in soil at depths >9m in east and west areas of the site.	The auditor found that groundwater quality under the audit site has been impacted by on-site sources (USTs) and impacted by TPH/BTEX. Plume extend off-site to the east and SE. Chlorinated hydrocarbons attributed to non-site sources, but found at concentrations only slightly above detection limits.	Groundwater SWL found at 8.9m to 10.3m in variably weathered basalt rock, and flowing to SE. Audit found Segment B applies (TDS range 1,200-3,100 mg/L). Precluded BU's of groundwater include potable water (acceptable) and stock watering.	Statement of Environmental Audit with an EMP. The site must be developed to maintain a barrier over the existing soils.

Property Address	Date Issued	Distance w.r.t site	Former land use	Remediation Undertaken	Soil Impact	Groundwater Impact	Other Groundwater (gw) Information	Outcome
				Groundwater remediated by MPVE. LNAPL removed by skimmers in one well. NA shown to be taking place.				
284 St Georges Road, Fitzroy North CARMS Ref 49222-2	August 2005	70 m South East	Wheelwright; dry goods stores; fuel merchant (1934-1946); woodworking; hosiery manufacturing, confectionary manufacturing.	UST removed from northern edge of site in 2004.	In near surface soil layers: metals (<HIL-F), TPH, PAHs incl B(a)P all >HIL-F. No elevated results reported in the underlying natural soils.	No site-based source of groundwater impacted found. Auditor found that groundwater quality under the audit site has been impacted by off-site source located to the west (111-113 Fergie Street) and impacted by TPH/MAH, PAH	Groundwater SWL found at 10.2m to 11.6m in variably weathered basalt rock, and flowing to SE. Audit found Segment A2 applies (TDS range 990-1,600 mg/L).	Statement of Environmental Audit with an EMP requirement. The site must be developed to maintain a barrier over the existing soils.
12-20 Taplin Street, Fitzroy North CARMs 52880-1	Feb 2005	160 m South	Residential; motor mechanic.	UST removed 2002. Hydraulic hoist removed 2004. Surface fill excavated to 0.7 m depth and removed from the site.	Minor fill found on the site. Metals >EILs and PAH & B(a)P >HIL-A.	Groundwater not sampled or tested.	Groundwater not sampled or tested but expected to lie at about 5-10 m depth and to flow east.	Statement of Environmental Audit. The site must be developed to maintain a barrier over the existing soils.
44-50 Taplin Street, Fitzroy North CARMs 59254-2	June 2013	40 m South	Residential; commercial (dry goods) warehouse from 1970s.	None required.	All exposed soils showed impacts <EILs and HILs.	Groundwater not sampled or tested.	Groundwater not sampled or tested. Expected to be Segment B.	Certificate of Environmental Audit.
140-148 Barkly Street, Fitzroy North	Oct 1999	1.4km west north-west	Various engineering and printing works and metal spaying and sand blasting.	None undertaken.	Metals and PAH & B(a)P >HIL-A.	Groundwater not sampled or tested	Groundwater not sampled or tested	Statement of Environmental Audit with an EMP requirement.

Property Address	Date Issued	Distance w.r.t site	Former land use	Remediation Undertaken	Soil Impact	Groundwater Impact	Other Groundwater (gw) Information	Outcome
CARMs 38593-1								The site must be developed to maintain a barrier over the existing soils.
63-69 Holden Street, Fitzroy North CARMs 36712-1	Aug 1999	360 m North-west	Residential; grocers; hardware manufacturing; shopfitting.	None required.	Impacted soil limited to 0.5 m depth. Copper and zinc, and PAH & B(a)P >ANZECC B.	Groundwater not sampled or tested	Groundwater not sampled or tested	Statement of Environmental Audit. The site must be developed to maintain a barrier over the existing soils.

6 Topography, Geology and Hydrogeology

6.1 Topography, Drainage and Natural Watercourses

The site is located at approximately 35 m above Australian Height Datum (AHD).

The nearest continuous surface water body to the site is the Merri Creek located 500-600 m to the east and north-east. No surface water was present on or adjacent to the site. The Creek meanders to the east and south-east of the site, and is considered to be the downgradient receiving water body for groundwater beneath the site. Merri Creek is a tributary to the Yarra River, which eventually flows into Port Philip Bay.

Surface drainage on the site, as well as regional surface drainage, is mostly likely to be through stormwater drains which drain into the Merri Creek.

6.2 Site Geology and Hydrogeology

The Geological Survey of Victoria's map of the area, 1:31,360 Melbourne sheet indicates the surface geology to be the Quaternary Age Newer Volcanics comprising basalt.

Based on historical investigations[1] near the site, the site is predominantly underlain by a layer of imported fill soils ranging in thickness from ground surface to about 0.5 metres below ground level (mbgl) followed by firm to stiff (silty) clays and then high strength, highly fractured basalt, as shown in Table 6-1 below.

Table 6-1 – Summary of Site Lithology

Lithology	Depth Range (mbgl)	Description
FILL: Sandy and Silty Clay	0.0 – 0.5	Dark brown, moist, soft, localised rubbish/rubble inclusions, moderate plasticity.
Silty CLAY	0.5 – 3.8	Light brown to dark brown, moist, high plasticity, homogeneous, soft - stiff.
Basalt	3.8 to at least 12.0	High strength, highly fractured with occasional clay infill.

Groundwater monitoring bores near the site found groundwater to be present in a basalt aquifer at depths between approximately 9.5 to 10.0 metres below ground level. This corresponds to about 25 mAHD.

Based on historical gauging data[1], monitoring has shown that:

- the inferred groundwater flow direction is south-east towards Merri Creek and the Yarra River.

[1] See Environmental Audit Report for site 111-113 Fergie Street, North Fitzroy, CARMS Ref 48804-1, including groundwater monitoring well GW10. Well GW10 was installed in 2002 about 1m from the northern boundary of the site at 132-134 Park Street.

- The salinity of groundwater at the subject site is approximately 2,800 mg/L and with a pH of about 7.1.

The average TDS in the area places groundwater in Segment B (Table 5.3 of the Environmental Reference Standard, ERS).

More details of the contaminants present in local groundwater will be discussed in Section 9.4 below.

6.3 Regional Geology and Hydrogeology

According to Melbourne 1:63300 (7822, First Edition, 1974) *Geological Survey of Victoria Maps*, the site is underlain by residual silty/clay, weathered basalt and Newer Volcanic Quaternary Olivine Basalts.

According to the Victorian Department of Environment, Land, Water and Planning (DELWP) *Groundwater Resource Report*, groundwater beneath the site is identified as being within an area expected to have Total Dissolved Solids (TDS) concentrations of between 1001 - 3500 mg/L. The average TDS in the area places groundwater in Segment B or C (Table 5.3 of the ERS), with the likely depth to groundwater of 5-10 mbgl within the East Port Phillip Bay groundwater catchment (see details Annex F of this PRSA report).

6.4 Existing Use of Groundwater

A search by the Auditor of the Visualising Victoria's Groundwater online tool for groundwater bores within 2 km of the centre of the site was undertaken on 5th July 2021. The search indicated that 312 groundwater bores were registered in the search area. The closest existing registered groundwater bore is located 100 m south-east of the site.

A total of 90 bores were used for groundwater investigation. A total of 157 bores were used for groundwater observation. One bore was used for commercial purposes (located 1.7 km north at a car wash facility). Three bores were used for extractive (domestic) purposes, the closest being located 1.35km north-west of the subject site. No indication of use was provided for the remaining 61 bores.

The full search results are provided in Annex F of this PRSA report.

7 Environmental Values Considered

7.1 Indicators and Objectives

Within PRSA, the Auditor must assess the potential for the site environmental condition to be detrimental to any **environmental values** of the site. According to the *Environmental Reference Standard* ("ERS", dated 25 May 2021 and made under section 93 of the *Environment Protection Act 2017*), 'environmental values' are the uses, attributes and functions of the environment that Victorians value. Some examples are water that is safe to drink; air quality that sustains life, health and wellbeing; land that is suitable for production of food; and an appropriate ambient sound environment.

The Act states (section 93[1]) that the ERS is to be used 'to assess and report on environmental conditions in the whole or any part of Victoria'. The ERS is an environmental benchmark. It brings together a collection of environmental values, indicators and objectives that describe environmental and human health outcomes to be achieved or maintained in the whole or in parts of Victoria.

Importantly, in the context of a PRSA, the ERS allows decision makers (as well as environmental auditors) to evaluate potential impacts on human health and the environment that may result from a proposal or activity (see EPA Publication 1992, dated June 2021).

In using the ERS, 'indicators' and 'objectives' are selected by an environmental on the basis that any possible environmental values may be feasible, with preference for any existing and likely future uses of the site. All likely 'sensitive uses' (such as a residence) will also be considered.

Indicators are usually defined in relation to each environmental value. The indicators are the parameters or markers used to assess whether environmental values are being achieved or maintained, or if they are threatened.

Objectives are the assessment benchmarks. An objective is the character, level, load, concentration or amount of an indicator used to assess whether an environmental value (or several environmental values) is being achieved, maintained or threatened. Most objectives are scientifically derived quantitative assessment levels or a prescribed scientific basis for assessment.

In the event that contamination on a site prevents the protection of an environmental value, the Auditor will conclude that the condition of the site is detrimental or potentially detrimental to the environmental value.

The complexity of the environment means that the environmental values for land are, by necessity, general in nature. ERS clause 10(3) describes circumstances where an environmental value may not apply to the land environment. It is important to note that an environmental value of the land environment may not apply to a site if either:

- the background level of an indicator is greater than the relevant objective; or
- the achievement or maintenance of the environmental value is impracticable due to characteristics of the site.

Environmental values of land may also not apply in instances where protections under other legislation prevent the land being used for an environmental value.

7.2 Elements of the Environment

The PRSA must assess the land environment and water environments (groundwater and surface water, including sediment). In doing this, an environmental auditor must consider the environmental values for these elements of the environment.

An 'element' of the environment is defined as any of the principal constituent parts of the environment including waters, atmosphere, land, vegetation, climate, sound, odour, aesthetics, fish and wildlife.

For this site, and taking into account the land use zoning and the uses that are permitted, relevant elements are considered to be the following;

- Land on the site;
- Groundwater beneath the surface of the site and down-hydraulic gradient of the site;
- Any surface water on the site.
- Any surface water run-off from the site;

On this basis, the above elements are considered relevant and therefore part of the relevant segment for the purposes of the PRSA.

7.3 Status of Land in the PRSA

The framework for the prevention of contamination of land is defined in Part 4 of the ERS. The ERS defines 'land environment' as including soil, fill, rock, weathered rock and sand, the vapour and liquids within interstitial space in the unsaturated zone, and sub-aqueous sediment. (While the definition of land in section 35 of the Act [with respect to contaminated land] includes groundwater, the ERS addresses groundwater as part of the water environment.)

The ERS outlines certain land use categories and associated environmental values to be protected and sets out corresponding environmental quality indicators and objectives. The EPA also requires that a PRSA should consider the land use zoning and the uses that are permitted. Land uses permitted under the current zoning of the site (MUZ) are discussed in Section 4.2.2 above.

The ERS includes five environmental values that apply to Victoria's land environment. These are included in Table 4.1 of the ERS and briefly described as:

- land dependent ecosystems and species;
- human health;
- buildings and structures;
- aesthetics; and
- production of food, flora and fibre.

Clause 11 of the ERS identifies six types of land uses: parks and reserves, agriculture, sensitive use, recreation / open space, commercial and industrial. These land use types are broadly consistent with the planning zones specified in the Victorian Planning Provisions (VPP). The

categories include the most common types of land use and are based on those provided in the NEPM (ASC).

Some environmental values require access to soil for them to be realised. Accordingly, sensitive use is divided into two main categories – high density and other (lower density). This is in recognition that some developments make maximum use of the land area, resulting in minimum access to soil, whereas other developments result in substantial access to soil (EPA Publ'n 1992, June 2021).

For example, there are childcare centres in high-density suburbs with limited access to soil, and others in outer suburbs where the children have ready access to soil. Similarly, a sensitive use in an inner-city area may have different indicators when compared to a sensitive use in an outer suburban area. For example, a key pathway of exposure to contamination for sensitive land use is through food production, such as home-grown vegetables or urban farming.

In inner city areas, food will likely be grown in above-ground containers or in restricted areas due to limited access to the underlying soil, so the potential exposure to contamination at a specific site is often low. However, in the outer suburbs (or in inner suburban sites with sufficient space), plants may have substantial access to the underlying soil, meaning the potential for exposure to contaminated soil is higher.

Therefore, a sensitive land use type may occur in a high-density development area where access to underlying soil is minimal, or in an area where the access to the underlying soil is greater. Section 10.4 below discusses the aspect in relation to the subject site.

The environmental values of land to be protected are dependent on the proposed land use and are shown in Table 7-1 below.

Table 7-1 – Environmental Values of Land

Environmental Value	Land Use							Remarks
	Parks and Reserves	Agriculture	Sensitive Use (high density)	Sensitive Use (lower density)	Recreation / Open Space	Commercial	Industrial	
Land dependent ecosystems and species: natural ecosystems	✓							Land quality that is suitable to protect soil health and the integrity and biodiversity of natural ecosystems, modified ecosystems and highly modified ecosystems.
Land dependent ecosystems and species: modified ecosystems	✓	✓		✓	✓			
Land dependent ecosystems and species: highly modified ecosystems		✓	✓	✓	✓	✓	✓	

Environmental Value	Land Use							Remarks
	Parks and Reserves	Agriculture	Sensitive Use (high density)	Sensitive Use (lower density)	Recreation / Open Space	Commercial	Industrial	
Human Health	✓	✓	✓	✓	✓	✓	✓	Land quality that is suitable for the specific land use and safe for the human use of that land. Persons may be exposed to uncovered soil (e.g. where buildings or pavements do not exist and in garden areas). Workers engaged in subsequent excavations for construction or maintenance purposes may also be exposed to the soil. Volatile organic vapours can also migrate through structures, potentially exposing occupants to these substances.
Buildings and Structures	✓	✓	✓	✓	✓	✓	✓	The soils should not attack or degrade building materials such as buried unprotected steel or concrete.
Aesthetics	✓	✓	✓	✓	✓	✓		Aesthetic issues include the quantity, type and distribution of foreign material or odours in relation to the specific land use and its sensitivity. The soil should not be offensive to the senses of human beings (e.g. visually offensive or odorous).
Production of flora and fauna and fibre	✓	✓		✓				Land quality that is suitable for the safe human consumption of food, flora and fibre and that does not adversely affect produce quality or yield.

(Highlighted beneficial uses apply to the subject site and considering the MUZ zoning)

7.4 Objectives for Assessment of Contaminated Land

Table 4.3 of the ERS outlines objectives and indicators to allow determination of whether the level of any contaminant at any site poses an unacceptable risk to an environmental value. Table 7-2 below shows the environmental values and corresponding indicators applicable for this PRSA.

Table 7-2 – PRSA Indicators for Protection of Environmental Values

Environmental Value	Indicators
Land dependent ecosystems and species	Inorganic and organic contaminants set out in Appendix A of Schedule B2 of the NEPM (ASC) and any other contaminants present at the site as determined by the current use or site history assessed in accordance with the NEPM (ASC).

Environmental Value	Indicators
Protection of human health	Contamination must not cause an adverse effect on human health and the level of any indicator must not be greater than the investigation levels specified in the NEPM (ASC). Inorganic and organic contaminants set out in Appendix A of Schedule B2 of the NEPM (ASC) and any other contaminants present at the site as determined by the current use or site history assessed in accordance with the NEPM (ASC).
Buildings and structures	pH, sulfate, chloride, redox potential, salinity or any chemical substance or waste that may have a detrimental impact on the structural integrity of buildings or other structures.
Aesthetics	Any chemical substance or waste that may be offensive to the senses
Production of food, flora and fibre	Inorganic and organic contaminants set out in Appendix A of Schedule B2 of the NEPM (ASC) and any other contaminants present at the site as determined by the site history assessed in accordance with the NEPM (ASC).

7.5 Soil Investigation Levels

7.5.1 Definition

To evaluate the risk to environmental values, environmental data representative of the site condition is screened against investigation levels. The investigation level is defined by NEPM (ASC) (Schedule B1) as follows:

Investigation levels *(and screening levels) are the concentrations of a contaminant above which further appropriate investigation and evaluation will be required. Investigation and screening levels provide the basis of Tier 1 risk assessment. A Tier 1 assessment is a risk-based analysis comparing site data with generic investigation and screening levels for various land uses to determine the need for further assessment or development of an appropriate management strategy. The application of investigation and screening levels is subject to a range of limitations.*

An investigation level is not a clean up goal, nor does it indicate the need for remedial action. Rather it identifies situations that require further consideration.

The Auditor has compared results of the site investigations with threshold environmental and health investigation levels for the environmental value of human health as outlined in the following sections.

7.5.2 Maintenance of Highly Modified Ecosystems

The Auditor has adopted the following Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) from the NEPM (ASC), Schedule B1:

- EILs for the protection of terrestrial ecosystems have been derived for common soil contaminants based on a species sensitivity distribution model developed for Australian conditions. EILs depend on site-specific soil physicochemical properties, land use scenarios and background conditions, and have been derived for arsenic, copper, chromium (III), nickel, lead, zinc, DDT and naphthalene.

- ESLs for the protection of terrestrial ecosystems have been developed for selected petroleum hydrocarbon compounds and fractions. ESLs broadly apply to coarse- and fine-grained soils and site-specific land uses.

Such criteria have also been adopted for the assessment of the environmental value *Production of flora and fauna and fibre*.

Application of EILs requires assessment of background soil conditions, as the majority of EILs are calculated based on a maximum added contaminant limit (ACL) above the ambient background concentration (ABC), which includes naturally occurring background plus a contribution from diffuse pollution sources such as motor vehicle emissions.

EILs and ESLs are applicable to the soil within 2 m of the site surface, unless extensive earthworks are planned. For this audit, on-site and off-site soil conditions were assessed against commercial/industrial land use criteria (60% species protection), and urban residential/public open space land use criteria (80% species protection).

The methodology assumes that only contaminant levels over and above this background concentration could have an adverse effect on the environment. EILs are not applicable to agricultural soils. These soils need to be evaluated in relation to crop toxicity, plant contaminant uptake and consideration of soil type.

Toxicity of soil contamination (organic and inorganic) generally reduces over time to a lower or more stable level by binding to various soil components and decreasing their biological availability. For the purpose of EIL derivation, a contaminant incorporated in soil for at least two years is considered to be aged contamination. Fresh contamination is usually associated with current industrial activity and chemical spills.

For COPCs for which there are no EILs/ESLs published in the ASC NEPM, the Auditor/Assessor may choose to adopt international criteria or to develop site-specific criteria using risk assessment.

7.5.3 Human Health Guidelines

For assessment of environmental value of human health, the Auditor has adopted the following health investigation levels (HILs) from the NEPM (ASC), Schedule B1:

- For assessment of sensitive land uses: HIL-As – 'standard' residential with gardens/accessible soil (with home grown produce contributing less than 10% of vegetable and fruit intake and no poultry), also includes children's day care centres, preschools and primary schools; and
- For assessment of high-density residential areas: HIL-Bs – residential with minimal opportunities for soil access includes dwellings with fully and permanently paved yard space such as high-rise buildings and flats.

As a minimum, the maximum or 95% UCL should be compared to the HILs [NEPM (ASC), Section 1.3.2, Schedule B7]. However, where there is sufficient data and it is appropriate for the exposure being evaluated, the arithmetic mean (or geometric mean in the case of a log normal distribution) should also be compared to the HILs. The relevance of localised elevated values should be considered and should not be obscured by consideration only of the relevant mean of the results.

The results should meet the following criteria:

- the standard deviation (SD) of the results needs to be less than 50% of the HIL; and
- no single value exceeds 250% of the HIL.

For analytes where there are no health investigation levels published in the NEPM (ASC), the Auditor has considered the following additional guidelines:

- NEPM (ASC) Schedule B1 (and CRC CARE - Friebel and Nadebaum - 2011): Soil Health Screening Levels (HSLs) for Direct Contact - available for BTEX, naphthalene and TRH; and
- NEPM (ASC): Management Limits (MLs) for petroleum hydrocarbon compounds, which protect against imminent fire and explosive hazards; and where warranted.
- USEPA (2019): Regional Screening Levels for Chemical Contaminants – residential and industrial soil screening levels – used for screening soil COPCs where Australian guidelines are not available.

7.5.4 Aesthetics

The ERS requires that land not be offensive to the senses of human beings based on contamination. Aesthetic issues may include discoloured or malodourous soils and soils with unusual consistency or containing waste.

This environmental value helps to ensure the community lives in an aesthetically pleasing environment that is not degraded by the effects of land contamination.

7.5.5 Buildings and Structures

According to the ERS, the integrity of structures or building materials should not be adversely affected by or corroded by contamination on the land. The Australian Standard 2159-2009 *Piling Design and Installation* outlines the classification for exposure of concrete and steel materials. The exposure conditions relate to levels of sulphates, chlorides, and pH in the soil and how these influence engineering design requirements for subsurface infrastructure (including footings, pits, sumps, pipes, drains etc.)

It is also noted that the ASC NEPM MLs for petroleum hydrocarbon compounds have been derived to avoid or minimise the potential for adverse effects on buried infrastructure, such as penetration of, or damage to, in-ground services.

7.5.6 Production of food, flora and fibre

The use of land for the production of crops (including food, timber and flowers) and pastures for the farming of animal produce is extensive in Victoria. However, the production of food, flora and fibre is not limited to an agricultural environment. While food, flora and fibre may not be 'farmed' in other land use environments, parks, reserves and the sensitive land use environments (including residential land) support this environmental value to a greater or lesser extent (for example, home vegetable production, backyard chickens). In addition, food production on land under water, such as flood irrigation for growing rice, is also recognised.

The Auditor has adopted Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) from the NEPM (ASC), Schedule B1, have been adopted for the assessment of the environmental value *Production of flora and fauna and fibre*.

7.6 Status of Groundwater in the PRSA

The PRSA is expected to assess the land environment and water environments (groundwater and surface water, including sediment). In doing this, the environmental auditor must consider the environmental values for these elements of the environment.

Nevertheless, the EPA guidance on PRSAs states that the sampling or assessment of groundwater if not obligatory for the conduct of a PRSA, and therefore should not be undertaken as a routine part of any limited sampling program. If sampling of groundwater it is warranted in the opinion of the auditor, EPA advises that groundwater sampling or assessment should be determined based on the likely source (on-site or off-site) of contamination, and whether there is an existing or likely exposure pathway in the context of the existing or proposed land use.

Clause 15 of the ERS is used to identify the environmental values for groundwater based on the segment classification. To determine the groundwater environmental values for the site and proposed activity, both regional groundwater conditions and current use onsite are considered. Another consideration is how groundwater is currently being used off-site and whether this use could change in the future. The relevant environmental values for groundwater are:

- water dependent ecosystems and species;
- potable water supply (acceptable);
- agriculture and irrigation (irrigation and stock-watering);
- industrial and commercial use;
- water-based recreation (primary contact);
- Traditional Owner cultural values; and
- buildings and structures.

Potable mineral water supply and geothermal properties are not considered to be environmental values at the subject site as the property is not within or near a mineral springs area and the inner Melbourne aquifers do not have geothermal properties.

When determining whether an environmental value is ‘likely’ or ‘existing’, EPA requires that auditors give consideration to both registered and unregistered bores. Where a bore is installed and registered for a use, in the absence of evidence to the contrary, the relevant environmental value must be considered existing. Bores used for drought relief are considered to represent an existing use, even if they are not in use at the time of the audit.

In the absence of evidence to the contrary, where a bore is registered for stock and domestic use, the relevant environmental values must be assumed to be existing.

In cases where groundwater is shallow (less than 3 metres below ground level), or a development includes excavation that approaches the water table, direct contact with groundwater may occur during construction or occupation of a development. In these circumstances and if chemical substances in concentrations greater than background levels have been identified in groundwater, the auditor must consider potential risks to human health caused by direct contact.

Clause 14 and Table 5.2 define segments of groundwater based on values of Total Dissolved Solids. Environmental values appliable to each groundwater segment are defined in Table 5.3 of the ERS. Indicators and objectives for groundwater are defined in Table 5.4 of the ERS.

8 Preliminary Conceptual Site Model

8.1 Typical Risks Posed by Contaminated Soil

Soil (and groundwater) contamination can result in potential hazards on and off-site. The 'source-pathway-receptor' model is used by the Auditor to assess the hazards. That is, the hazard presented by a source of contamination can travel via one or more pathways and impact on a receptor (people, animals, plants, etc.). The most common receptors are:

- Humans living, working, or recreating on or near a potentially contaminated site (or remotely in the case of indirect exposure to contaminants);
- Plants grown on the site or in the wider ecosystem; and
- Animals (pets, other domestic species, or animals in the food chain of an affected ecosystem).

Another potential impact of contamination which is not a hazard is aesthetic impairment (sight, smell etc) and this can be critical in restricting land use. Potential impacts on engineering structures (particularly building foundations) from chemicals remaining within the soil are also assessed by the Auditor.

All of the above factors are reviewed within an assessment of the contamination hazards and risks at this site. For an assessment of the level of risk from contaminants at the site, consideration is given to potential human health risks from long term residential occupation. However, potential environmental risks resulting from migration of contaminants have also been considered.

A conceptual site model (CSM) has been prepared (below) by the Auditor to assist in the qualitative representation of contamination risks that may be present at the site. A CSM is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors[2].

The development of a CSM is an essential part of all site assessments and provides the framework for identifying how the site became contaminated and how potential receptors may be exposed to contamination either in the present or the future.

8.2 Potential Sources

In considering the potential for contamination of the site, the Auditor has taken into account Section 9 of the PSI Report by iEnvironmental (2021), as contained in Annex G of this PRSA Report.

[2] See the NEPM (ASC), Section 4 of Schedule B2.

Given the long history of residential use and domestic activity at the site, the Auditor considers that the site (like many of the older residential suburbs across metropolitan Australia) exhibits the following potential sources of site contamination arising from:

- Use and (historical) disposal on-site of the following typical household products/wastes:
  - common gardening products such as fertilisers, weedkillers, insecticides and oil and fuels associated with vehicles and powered gardening tools.
  - plastic items, batteries, cleansers and disinfectants, metal containers, laundry wash waters, nightsoil, and ashes from wood-fired/coal-fired ovens, fireplaces, and a possible garden incinerator.
  - common domestic building and maintenance products such as asbestos-containing materials (including fragments of asbestos sheet), paints and paint strippers, thinners and degreasers (including methylated spirits and turpentine), kerosene, caustic liquids, and scrap metal products.
- Importation of fill, compost and topsoil associated with garden maintenance.

Given the long history of residential use and light industrial/commercial activity near at the site, the Auditor considers that potential off-site sources of contamination include:

- Various activities related to motor garages, engineering workshops, service stations and/or various small-scale manufacturing businesses;
- Regional diffuse pollution of groundwater from unknown sources up-hydraulic gradient to the north and north-west.

The Auditor also considers that the site may also be potentially affected by migrating landfill gas in the subsurface (see Section 5.4 above).

8.3 Contaminants of Potential Concern

The principal contaminants of potential concern (CoPCs) are considered by the Auditor based on the site history, review of available reports, and the site inspection, to be:

- PAHs;
- TRH/BTEXN;
- Asbestos;
- Metals and inorganics including soil pH;
- Phenols;
- Organic (incl. chlorinated) solvents;
- OCP and OPP pesticides;
- Others including Cyanide, PCBs, VOCs and SVOCs
- Landfill gas, especially CH_4 and CO_2.

The Auditor has assessed the site history and reported laboratory analyses (iEnvironmental, 2021) and is satisfied that the above analytes appropriately cover the CoPCs for the site.

8.4 Potential Receptors

Based on the gathered information, it is anticipated that exposure by the following receptors to CoPCs from soil or groundwater at the site may occur (given the continued use for residential use):

- Flora and fauna;
- Humans:
  - Current and future on-site residents and visitors;
  - Future on-site construction and maintenance workers;
  - Off-site residential or commercial users and visitors.
- Aquatic ecosystems and human users of the Merri Creek, including where groundwater may discharge to surface water (e.g. Yarra River and/or Port Phillip Bay);
- On-site and off-site extractive users of groundwater.
- Buildings on-site may be exposed to corrosive or aggressive ground conditions.

8.5 Potential Pathways

Due to the presence of the buildings on the site and the extensive decking and paving across the site (currently totalling and estimated 98.5% of the site area), and the lack of extractive uses of groundwater from beneath the site, the Auditor considers that the following pathways for exposure to the identified CoPCs are incomplete:

- Dermal contact with, or inhalation or ingestion, of surface and sub-surface soils by humans and fauna;
- Dermal contact with, or consumption or ingestion, of extracted groundwater or surface water by humans and fauna;
- Consumption of home-grown vegetables by humans and fauna.

The Auditor considers that the following pathways for exposure to the identified CoPCs are potentially complete:

- Dermal contact with, or inhalation or ingestion, of surface and sub-surface soils by construction or maintenance workers conducting intrusive (subsurface) activities;
- Exposure to surface and sub-surface soils by on-site flora;
- Surface water discharge to Merri Creek;
- Vertical migration of soil impacts leached to underlying groundwater;
- Vertical and lateral migration of chemicals especially through gravel or permeable fill around underground services e.g. sewers and drains;
- Migration off-site of contaminants dissolved in groundwater; and
- Exposure to landfill gas in sub-surface soils.

The following Section 9 of the report considers the Auditor's review of the preliminary site investigation conducted at the site, taking into account the above conceptual site model.

9 Environmental Report Review

9.1 Preliminary Site Investigation Report

A PSI was undertaken by iEnvironmental between January 2021 and February 2021, including soil sampling and testing. The PSI Report is contained in Annex G of this PRSA report.

9.1.1 Purpose and Scope of Work

The purpose of this PSI was to determine whether there is potential for former or current activities or surrounding land use activities to have resulted in contamination of the site which would cause significant human health or environmental risk.

The specific objectives of the PSI were to:

- identify former or current potentially contaminating activities;
- identify the potential type and nature of contamination;
- identify any potential contamination present in the shallow soil beneath the site;
- review the site condition and sampling results; and
- assess the site suitability for the current and future proposed uses.

The scope of works included the following:

January 2021

- Prepare health, safety and environment documents for the investigation.
- Undertake an inspection of the site.
- Obtain a desktop site history “Enviro-Screen” report (Land Insight, 2021).
- Obtain a Dial-Before-You-Dig report.
- Obtain soil samples from four locations at the site and arrange laboratory testing of those samples

February 2021:

- Prepare and issue of a PSI report.

9.2 Soil Investigation

iEnvironmental obtained a total of four primary soil samples, from depths of 0.1m to 0.5m below ground level, and two Quality Assurance/Quality Control (QA/QC) samples by hand tools from four locations at the site.

The layout of such sampling locations is depicted in Figure 9-1 below.

Figure 9-1 – Site Sampling Locations

(courtesy iEnvironmental, 2021)

Sampling locations BH01 and BH02 were only advanced to approximately 0.3 mbgl and 0.4 mbgl respectively due to refusal on tree roots. Potentially reworked natural material was inferred from field observations within BH03 and natural material was encountered within BH04 at approximately 0.4 mbgl.

iEnvironmental noted within the report that no obvious signs of potential soil contamination were identified during the sampling but that aesthetic issues associated with the presence of trace amounts of plastic were noted within the fill material.

iEnvironmental reports no significant odours or staining were observed during soil sampling. Other indications of contamination were noted if evident and screened for volatile organic compounds (VOCs) using a calibrated photo-ionisation detector (PID).

No ACM fragments were observed during the site inspection or in soil below the surface during soil sampling.

No soil stockpiles were present on the premises.

9.2.1 Soil Sample Analyses Conducted

The soil and QAQC samples were transported to a an independent laboratory in Melbourne (Eurofins) for chemical analysis. Eurofins are accredited by the National Association of Testing Authorities (NATA) for the analyses undertaken. Laboratory documentation is included within Appendix E of the PSI report (see Annex G of this audit report).

The soil samples were analysed as individual samples for three primary soil samples for the following:

- total recoverable hydrocarbons (TRH) (C_6-C_{40});
- benzene, toluene, ethylbenzene, xylenes and naphthalene (BTEXN);
- polycyclic aromatic hydrocarbons (PAH);
- 8 metals and asbestos (presence/absence);
- one primary soil sample for VIC EPA Screen for Soil Hazard Classification;
- one field duplicate soil sample for TRH, BTEX, PAH and 8 metals; and
- one rinsate blank and one trip blank for TRH C_6-C_{10}, BTEX plus F1.

The Auditor is satisfied that the analyses conducted were consistent with the CoPCs for the site as discussed in Section 8.3 above.

9.2.2 Results of Soil Analyses

Soil analytical results and adopted assessment criteria for human health and the environment are presented in summary tables in Annex A of this PRSA report.

The samples were assessed against adopted assessment criteria for the current and proposed uses. The soil assessment reported the following compounds above the assessment criteria:

- Benzo(a)pyrene ([B(a)P] was found to be in excess of NEPM (ASC) EIL criteria for three samples, obtained from sampling locations BH1, BH2 and BH3 at depths of 0.1m, 0.4m and 0.1 m respectively. B(a)P TEQ was found to be in excess of NEPM (ASC) HIL-A in the same samples.
- Lead was found to be in excess of NEPM (ASC) HIL-A criteria for two samples, obtained from sampling locations BH1 and BH2 at depths of 0.1m and 0.4 m respectively.
- Concentrations of zinc were detected across all soil samples above the NEPM (ASC) generic EILs (125 mg/kg), with the highest concentrations recorded at BH01/0.1 (370 mg/kg).
- Soil pH was found to be slightly acidic (6.6).
- Asbestos fibres in soil were not detected at the reporting limit of 0.01% w/w.

The calculated B(a)P TEQ (half LOR) exceeded the NEPM (ASC) HIL-A criterion for a low density residential use site (3 mg/kg) in soil samples BH01/0.1 (5.1 mg/kg), BH02/0.4 (7.1 mg/kg) and BH03/0.1 (5.5 mg/kg).

Concentrations of B(a)P were detected above the NEPM (ASC) ESLs for an urban residential site (0.7 mg/kg) in soil samples BH01/0.1 (3.4 mg/kg), BH02/0.4 (5.1 mg/kg) and BH03/0.1 (3.8 mg/kg), however remained below the CRC CARE high reliability derived ecological guideline value[3] (33 mg/kg).

All other analytes for these and the other remaining samples (including VOCs, OCPs, PCBs, total fluoride, cyanide and phenols) were found to exhibit concentrations less than the assessment criteria. This includes all analyses of a sample of natural soil at a depth of 0.4m.

All analyses for all samples were found to be considerably less than NEPM (ASC) HIL-D - *Commercial/industrial* criteria. Such a set of criteria is applicable to on-site workers involved in a

[3] CRC CARE (2017), Technical Report No. 39, *Risk-based management and remediation guidance for benzo(a)pyrene*. Cooperative Research Centre for Contamination Assessment and Remediation of the Environment, Jan 2017.

construction setting, for example during development works associated with the proposed use, or in current or future intrusive maintenance (eg levelling, digging, trenching) and associated contact with site soils.

With the exception of B(a)P TEQ in three samples, all samples were found to exhibit concentrations less than the assessment criteria for HIL-B (i.e. Residential – high density). The NEPM (ASC) describes such a use as "Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments". The Auditor considers that such description is consistent with current and proposed future uses of the site.

During the Auditor's inspection of the site on 2nd July 2021 it was evident that fill (and associated contamination) are primarily located in isolated pockets on the perimeter of the site (see Plate **4-4** above).

In reviewing Section 8.12, Quality Results Analytical Summary, of the PSI report, the Auditor the overall quality of the data is considered to be acceptable for interpretive use. Taking into account the objective of the PSI, the Auditor is confident that the site contamination profile reported by iEnvironmental is representative of actual site conditions at the site at the locations sampled.

9.3 Auditor Comments on PSI Conclusions

In reviewing the PSI Report, the Auditor makes the following comments on the conclusions of that report:

- The Auditor agrees with the statements made in Section 12.1 of the PSI report that the single dwelling use of the site appears to have not changed since at least the year 1900.
- The Auditor agrees with other conclusions made in Section 12.1 of the PSI report that contaminants found in sampling and testing of shallow soils at the site are not considered to present a significant risk to human health or ecology given:
  - *the hardstanding and brick paving covering > 95% of the site;*
  - *future proposed development that will further reduce the area of exposed soils across the site;*
  - *minimal garden areas covered by ornamental plants, with no bare soil and no significant edible plants.*
  - *a lack of sensitive ecological receptors both onsite and in the vicinity; and*
  - *presence of natural material with very low concentrations of potential contaminants from approximately 0.4 mbgl.*
- Other conclusions and recommendations provided in the PSI report are not unreasonable but not strictly relevant to the purpose and scope of this PRSA.

9.4 Historical Groundwater Investigations

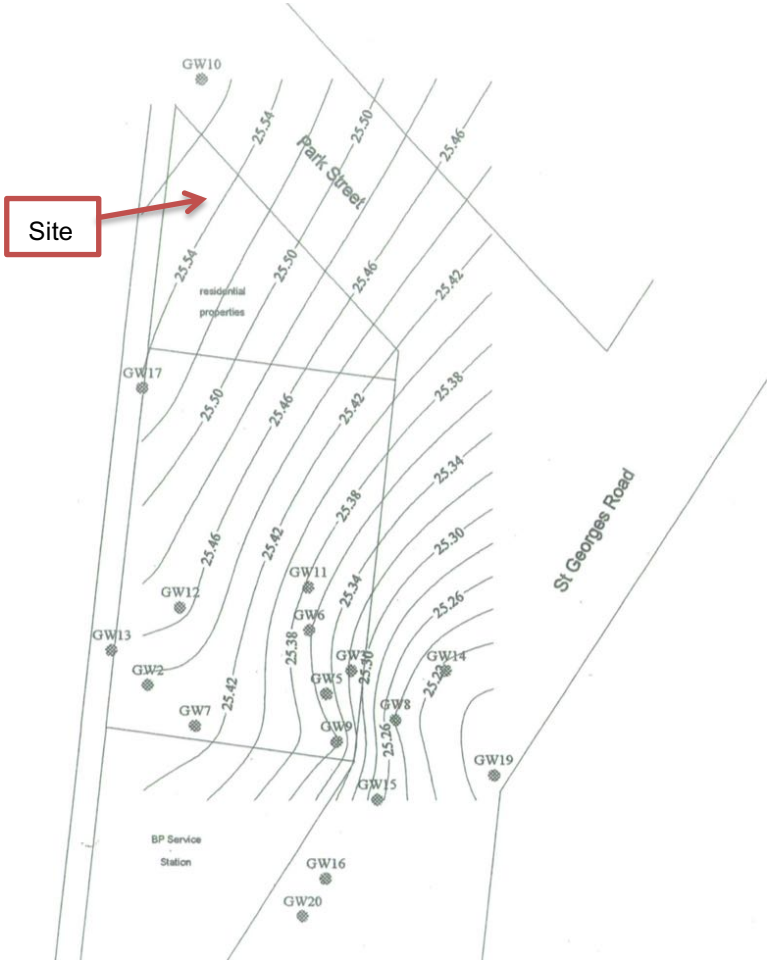
As discussed in Section 6.2 above, groundwater was investigated near the site as part of environmental audits completed in 2003 and 2004. In particular, groundwater monitoring well GW10 was installed to a depth of 12.0 mbgl in 2002 about 1m from the northern boundary of the subject site (EPA Ref. CARMS 48804-1).

The standing water level of GW10 was found to be 9.5 mbgl. Salinity (TDS) was measured to be 2,800 mg/L. Water pH was found to be neutral at 7.1. No odours were detected.

The contours of elevation in that and other monitoring wells associated with the investigations at that time are depicted in Figure 9-2 below.

Figure 9-2 – Groundwater Contours near the Site, 2002-2003

(courtesy Parsons Brinckerhoff, 2003 - EPA Ref. CARMS 48804-1)



Laboratory results for a sample obtained in September 2002 from GW10 reported the following:

- petroleum hydrocarbons (TPH, C_6-C_9, C_{10}-C_{14}, C_{15}-C_{28}, C_{29}-C_{36} and >C_9), and mono-aromatic hydrocarbons including benzene, were all less than laboratory detection limits.
- Chlorinated hydrocarbons, with the exception of TCE, were all less than laboratory detection limits. TCE, found at 0.010 mg/L, is well within the criteria of 0.020 mg/L for drinking water[4].
- Although a range of dissolved metals were detected in the sample, all concentrations were consistent with natural background levels associated with the Newer Volcanics aquifer.

Given the relatively benign use of the site and surrounding areas since circa 2002, in the context of site contamination, the Auditor considers that the above outline of groundwater quality would be largely consistent with its present condition.

The results of the above soil and groundwater sampling and testing at and near the site is further assessed in Section 10 below in relation to environmental values of the land and of the groundwater.

[4] National Health and Medical Research Council (NHMRC) Australian Drinking Water Guidelines (ADWG) 6, 2011 (updated 2019)

10 Environmental Values at the Site

10.1 Approach to Assessing the Likelihood of Contamination

The EPA requires that the PRSA must assess the land environment and water environments (e.g. groundwater). In doing this, the environmental auditor must consider the environmental values for these elements of the environment (EPA *Guideline for Conduct of Preliminary Risk screen Assessments, published by the Environment Protection Authority*, July 2021).

In the following Sections, the Auditor has assessed the likelihood of the land being contaminated land and, if so, the need for an environmental audit considering the environmental values that apply to the site (taking into account the existing use and the proposed use).

10.2 Likelihood of Landfill Gas Contamination

10.2.1 Relevant EPA Guidance

Section 5.4 above identified the presence of a former landfill located in Thomas Kidney/Rushall Reserve, Fitzroy (about 460m east of the subject site). The Auditor considers that migrating landfill gas may potentially impact the environmental value of Human Health at the site.

Landfill gas is primarily a breakdown product of the organic content of waste. Principally, bacteria break down the organic matter into methane (CH_4) and carbon dioxide (CO_2), as well as a range of trace gases. The waste type will drive the quality and quantity of gas that is generated and available for recovery and/or management. For a typical municipal landfill, 50-55% methane is commonly measured (Landfill BPEM).

Methane may give rise to a variety of hazards if it is able to migrate to, or accumulate in a property or confined space. Methane generated in sufficient quantities may form an explosive mixture with air (at approximately 5-15% by volume in air). It can also act as an asphyxiant, and, in particular circumstances, it may be toxic (Landfill BPEM).

Landfill gas will move from a high-pressure area to a low-pressure area independently of its density. Sub-surface migration from within the landfill wastes will be higher in highly permeable geologies (e.g. sand, gravel and fractured rock) than through low-permeability ground (e.g. clay).

The risk of landfill gas migration impacting on proposed development within a 500 m landfill buffer is discussed in EPA Publication 788.3, *Best Practice Environmental Management: Siting, Design, Operation and Rehabilitation of Landfills* (the Landfill BPEM). The Landfill BPEM generally recommends that planning and responsible authorities require an Environmental Audit to assess the risk of landfill gas migration impacting on proposed development.

EPA Publication 1642 is intended for use by planning and responsible authorities under the *Planning and Environment Act 1987*. It provides information and more specific advice on assessing planning

permit applications and planning scheme amendments that would lead to development near an operating or closed landfill.

The Landfill BPEM recommends where the buffer is proposed to be encroached, the responsible planning authorities need to be provided with sufficient information by the proponent to satisfy them (the planning authority) that the proposed development or re-zoning will not be adversely impacted by its proximity to the landfill site.

EPA Publication 1642 provides further details on the necessary standardised, risk-based approach for such an assessment. The Publication offers the following four-step approach to determine if and what level of assessment of the risk of landfill gas impacts is required:

- Step 1: Assign a proposal score.
- Step 2: Assign a landfill score.
- Step 3: Use the proposal score and landfill score to calculate an overall score.
- Step 4: Determine the level of assessment required.

For the former landfill at Thomas Kidney/Rushall Reserve, the Auditor has applied the scoring process as follows:

- Proposal score: 1 point ("alterations to an existing building using similar construction style and standards (excluding below ground structures").
- Landfill size: 2 points (based on an estimated landfill size of 30,000 $m^3 \pm 30\%$).
- Landfill type: 5 points (assumed to have been a putrescible waste landfill).
- Landfill age: 1 point (Assumed to be more than 50 years since waste last placed. The Auditor is aware that the landfill ceased operation in the 1950s).
- Overall Score = 1 x (2+5+1) = 8 points
- Level of Assessment Required: "**No further assessment is required**".

10.2.2 Auditor's Assessment of Landfill Gas Likelihood

The PSI report by iEnvironmental provides no advice on potential landfill gas migration for off-site sources.

Given the age of the landfill (at least 70 years), the Auditor considers that the likelihood of ongoing production of landfill gas at the Rushall Reserve area is extremely low. The Landfill BEPM, for example, states in Section 8.2.2 that:

"*Building and structure buffer distances apply to closed landfill sites until the site has stabilised to the point where the potential for subsurface gas migration has largely ceased. Typically, this will be a period of about 30 years*."

In conclusion, taking into account EPA Publication 1642, the Auditor considers that the former landfill at Thomas Kidney/Rushall Reserve will likely have a negligible impact on the subject site. Landfill gas at the site is therefore considered unlikely.

10.3 Likelihood of Soil Contamination

The environmental values of land associated with the proposed and potential uses of the site are outlined in Section 7 of this audit report. An assessment of the likelihood of harm, detriment or risk to environmental values of the site posed by the current condition of the site follows.

10.3.1 Land Dependent Ecosystems

The Auditor considers that in the context of the environmental value, *Land dependent ecosystems and species: highly modified ecosystems*, the site is unlikely to be contaminated land. Although concentrations of B(a)P in near surface soil were detected in soil samples, the Auditor considers that such impacts are located around the perimeter of the site and are unlikely to impact ecosystem and species across all of the site. No other COPCs were detected at significant concentrations with respect to *Land dependent ecosystems and species: highly modified ecosystems*.

B(a)P is a ubiquitous environmental contaminant, particularly in urban areas. It tends to be of greater concern in soil and sediment matrices than groundwater or surface water, due to its very low solubility. B(a)P is persistent in the environment and does not readily degrade. Nevertheless, B(a)P levels at the site are well within high reliability criteria (CRC CARE, 2017) for protection of ecosystem and species.

10.3.2 Human Health

The Auditor considers that in the context of the environmental value, *Human health*, the site is likely to be contaminated land.

The poly-aromatic hydrocarbon, B(a)P TEQ, was found in three soil samples with concentrations greater than the assessment criteria for HIL-B (i.e. Residential – high density).

The Auditor considers that the current and prosed use of the site can be described as: “Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments” (NEPM ASC). The presence of B(a)P TEQ at the site at level in excess of HIL-B is significant in terms of the environmental value, *Human health.*

In the context of the environmental value, *Human health*, the site is not likely to be affected by migrating subsurface ground gases or soil vapours. The site is not likely to affect the health of construction or maintenance workers.

10.3.3 Buildings and Structures

The Auditor considers that in the context of the environmental value, *Buildings and Structures*, the site is unlikely to be contaminated land.

The Auditor found no evidence of aggressive ground conditions or visible evidence of deteriorated buildings at the site. The groundwater beneath the site, albeit unlikely to come into contact with deep footings or services at the site, shows no evidence of aggressive qualities that may affect buried concrete or steel.

Sulphate was not analysed for in the assessment of the soil, however sulphate was not considered a contaminant of concern, and is not likely to naturally occur in elevated concentrations in soils at the site.

Taking into account Australian Standard (AS2159), *Piling – Design and Installation* (2009), the site the soil and groundwater at the site is considered unlikely to be corrosive or aggressive to subsurface structures.

10.3.4 Aesthetics

The Auditor considers that in the context of the environmental value, *Aesthetics*, the site is unlikely to be contaminated land.

No significant items of foreign matter, rubbish, staining, or odour were observed during soil sampling and during the Auditor's inspection. No potential ACM was observed or measured within any of the soil sampling locations across the site.

10.3.5 Production of flora and fauna and fibre

The Auditor considers that in the context of the environmental value, *Production of flora and fauna and fibre,* the site is unlikely to be contaminated land.

As discussed in Section 10.3.1, although concentrations of B(a)P in near surface soil were detected in soil samples, the Auditor considers that such impacts are unlikely to impact flora, fauna and fibre production at the site. No other COPCs were detected at significant concentrations in this context.

10.4 Pathways of Exposure at the Site

As discussed in Section 8 above, and in the context of the environmental value *Human Health*, it is relevant to consider the source-pathway-receptor linkages for the site in assessing the likelihood of contamination of land.

The current and proposed use of the site includes a paved, private courtyard but no scope for a yard, lawn, pond, swimming/spa pool, or home production of fruit or vegetables. The existing use of the site, the proposed development (construction) works and the ongoing occupation of the site do not involve direct contact with groundwater beneath the site or any extractive use of the groundwater.

Due to the presence of the durable physical barriers on the site, i.e. buildings and the extensive decking and paving across the site (and for the proposed use), and the lack of extractive uses of groundwater from beneath the site, the Auditor considers that the following pathways for exposure by humans to the identified CoPCs are incomplete:

- Dermal contact with surface and sub-surface soils, or inhalation or ingestion of those soils;
- Dermal contact with, or consumption or ingestion, of extracted groundwater or surface water by humans;
- Consumption of home-grown vegetables by humans.

This incomplete pathway is an integral part of the assessment of a current or proposed land use, as discussed in Section 7.3 above and in EPA Publication 1992, *Guide to the Environment Reference Standard* (June 2021).

On this basis, whilst in the context of the environmental value, *Human health*, the site is likely to be contaminated land, the Auditor considers that an environmental audit is not required because the soil contamination [B(a)P] will not prevent or restrict the current use or proposed land use. Therefore, no further investigation is considered necessary.

10.5 Likelihood of Groundwater Contamination

The environmental values of groundwater to be protected at the site are discussed in Section 7.6 of this PRSA report.

The Auditor considers that in the context of the environmental values of groundwater for Segment B*,* the site is unlikely to be contaminated land.

Groundwater lies beneath the site at a depth of about 9.5 mbgl. Section 9.4 above discussed the evidence describing the quality of the groundwater. There is no evidence identified by the Auditor that indicates that groundwater has been affected historically or currently by contamination of

another site either near the site or up-hydraulic gradient of the site. Indeed, as discussed in Section 5.7 above, contamination of groundwater is a concern only off-site down-hydraulic gradient about 20-30 metres from the southern boundary of the site (also see Table 5-3 above).

Based on a review of nearby environmental audit reports, circa 2003 and 2004, and taking into account the long history single dwelling residential use of the site, the Auditor is satisfied that the condition of groundwater at the site has not been impacted the historical activities at the site (eg by leaching of contaminants in soil or by migration of liquids through the soil profile).

The assessment of site history; site inspections; nearby site investigations by other auditors; the review of potential contaminants of concern together indicate that the present site conditions are unlikely to pose a risk of chemical degradation to any buildings and other structures coming into contact with groundwater.

On this basis, the Auditor is satisfied that the condition of groundwater at the site will pose very low and acceptable risk to human health and the environment and will not affect the current and future uses of the site.

10.6 Imminent Environmental Hazard

The Auditor is not aware of any dangerous environmental hazard, hazardous substances or non-aqueous phases liquids, associated with the site.

10.7 Need for an Environmental Audit

10.7.1 Auditor's Assessment of Environmental Values

In summary, this PRSA of the single dwelling detached residential site at 132-34 Park Street, Fitzroy North 3068 has shown that the land is unlikely to be contaminated with respect to the following environmental values:

- *Land dependent ecosystems and species: highly modified ecosystems;*
- *Buildings and Structures;*
- *Aesthetics; and*
- *Production of flora and fauna and fibre.*

The Auditor considers that the site is likely to be contaminated land in the context of the environmental value Human Health.

The Auditor considers that the condition of groundwater at the site will pose very low and acceptable risk to human health and the environment and will not affect the current and future uses of the site.

An environmental audit is considered not to be required as, in accordance with Division 2 of Part 8.3 of the Act and the EPA *Guideline for Conduct of Preliminary Risk Screen Assessments*, the contamination will not prevent or restrict the use or proposed land use. No further investigation of the environmental condition of the site is considered necessary.

10.7.2 Consideration of VPP

In conducting the PRSA, and considering the proposed future use of the site and the findings of the PSI, the Auditor has also had regard to Amendment VC203 (1st July 2021) of the VPP. In particular, the Auditor acknowledges that amendments to the *Environmental Audit Overlay*, to ensure that land is suitable for sensitive land uses such as dwellings, includes new exemptions for

buildings and works that do not disturb the soil. In this respect, Clause 45.03 of the current VPP states that:

The requirement for a preliminary risk screen assessment statement or an environmental audit statement in this provision does not apply to the construction or carrying out of buildings and works if:

- *The buildings and works are associated with an existing sensitive use, secondary school or children's playground, in Clause 62.02-1 or 62.02-2, and the soil is not disturbed;*
- *…….*

The Auditor is satisfied that the sensitive use of the site, continuing as a single dwelling semi-detached residence, and proposed building works (comprising the partial demolition of existing buildings and construction of a house extension), will involve no material disturbance of soils at the site.

In summary, based in multiple lines of evidence, the Auditor finds that no environmental audit of the site is necessary for the current use or the proposed use.

11 Auditor's Conclusions

11.1 Findings of the PRSA

A Preliminary Risk Screen Assessment (PRSA) is an environmental assessment that reviews information regarding the past use and activities undertaken at a site to consider the possible presence of contaminated land.

Under section 204(2) of the *Environment Protection Act 2017* (the Act), the purpose of a preliminary risk screen assessment is to:

- assess the likelihood of the presence of contaminated land;
- determine if an environmental audit is required; and
- recommend a scope for the environmental audit, if an environmental audit is required.

The PRSA follows an investigation process consistent with that of the existing Preliminary Site Investigation (PSI) outlined in the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPM [ASC]).

Clause 45.03 of the current Victoria Planning Provisions (VPP) states that:

Before a sensitive use (residential use, child care centre, pre-school centre, primary school, secondary school or children's playground) commences or before the construction or carrying out of buildings and works in association with a sensitive use commences:

- *A preliminary risk screen assessment statement in accordance with the Environment Protection Act 2017 must be issued stating that an environmental audit is not required for the use or the proposed use; or*
- *An environmental audit statement under Part 8.3 of the Environment Protection Act 2017 must be issued stating that the land is suitable for the use or proposed use.*

With an uninterrupted use as a single dwelling semi-detached residence since at least 1990, this PRSA of the site at 132-34 Park Street, Fitzroy North 3068 has shown that the land is unlikely to be contaminated with respect to the following environmental values:

- *Land dependent ecosystems and species: highly modified ecosystems;*
- *Buildings and Structures;*
- *Aesthetics; and*
- *Production of flora and fauna and fibre.*

The Auditor considers that the site is likely to be contaminated land in the context of the environmental value *Human Health*. However, an environmental audit is considered not to be required as, in accordance with Division 2 of Part 8.3 of the Act and the EPA *Guideline for Conduct of Preliminary Risk Screen Assessments*, the contamination will not prevent or restrict the use or proposed land use.

The Auditor's concludes that due to:

- the continued presence of the buildings on the site;
- the extensive decking and paving across the site (and for the proposed use);
- the uncontaminated nature of the groundwater beneath the site; and
- the lack of extractive uses of the groundwater,

there is (and will be) no viable pathway for exposure by humans to the identified contaminants in the surface and near surface soil. It is considered that no further investigation of the site is necessary.

11.2 Consideration of the VPP

In conducting the PRSA, and considering the proposed future use of the site and the findings of a 2021 preliminary site investigation (PSI), the Auditor has also had regard to Amendment VC203 (1st July 2021) of the VPP. In particular, the Auditor acknowledges that amendments to the *Environmental Audit Overlay*, to ensure that land is suitable for sensitive land uses such as dwellings, includes new exemptions for buildings and works that do not disturb the soil.

The Auditor is satisfied that the sensitive use of the site, continuing as a single dwelling semi-detached residence, and proposed building works (comprising the partial demolition of existing buildings and construction of a house extension), will involve no material disturbance of soils at the site.

11.3 Need for an Environmental Audit

In summary, based in multiple lines of evidence, the Auditor finds that no environmental audit of the site is necessary for the current use or the proposed use.

The Auditor provides the PRSA Statement shown at the front of this report.

12 Limitations

This PRSA report has been prepared in accordance with section 204(2) of the *Environment Protection Act 2017*. The findings of this report are based on the Scope of Work described Sections 1.0 and 2.0 above.

Salient GeoEnvironmental Consulting Pty Ltd (Salient) performed the services in a manner consistent with the normal level of care and expertise exercised by members of the environmental consulting profession, in accordance with normal prudent practice and by reference to applicable EPA and industry standards, guidelines and assessment criteria in existence at the date of issue of this report, and any previous site investigation and assessment reports referred to in this report. No warranties, expressed or implied, are made.

This report was prepared in July 2021 and is based on the conditions encountered and information reviewed at the time of preparation. Salient disclaims responsibility for any changes that may have occurred after this time.

This report should be read in full and no excerpts are to be taken as representative of the whole report. No responsibility is accepted by Salient for use of any part of this report in any other context.

It is acknowledged that the audit document and report may be used by Frazer Property Investments Pty Ltd, the City of Yarra and the Environment Protection Authority (Victoria) in reaching their conclusions about the site. The scope of work performed in connection with the audit review may not be appropriate to satisfy the needs of any other person.

The advice provided herein relates only to the audit of soil, surface water, soil gas and groundwater conditions at the 132-134 Park Street, Fitzroy North, Victoria (the site) and must be reviewed by a competent engineer or scientist, experienced in assessment of contaminated environments, before being used for any other purpose. Salient accepts no responsibility for other use of the data.

It should be noted that because of the inherent uncertainties in sub-surface evaluations, changed or unanticipated sub-surface conditions may occur that could affect total project cost and/or execution. Salient does not accept responsibility for the consequences of significant variances in the conditions.

All conclusions and recommendations made in the report are the professional opinions of the Salient personnel involved with the project and, while normal checking of the accuracy of data has been conducted, Salient assumes no responsibility or liability for errors in data obtained from regulatory agencies or any other external sources, nor from occurrences outside the scope of this project.

An understanding of the site conditions depends on the integration of many pieces of information, some regional, some site specific, some structure-specific and some experienced-based. Hence this report should not be altered, amended or abbreviated, issued in part or issued incomplete in any way without prior checking and approval by Salient. Salient accepts no responsibility for any

circumstances which arise from the issue of a report which has been modified in any way as outlined above.

This report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners. Opinions and judgements expressed herein, which are based on Salient's understanding and interpretation of current regulatory standards, should not be construed as legal opinions.

13 References

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Annex A
Tables of Analytical Results

Salient+
GeoEnvironmental Advisory

1. Soil Petroleum Hydrocarbons

	BTEX						TRH							PAH																		TPH				
	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	C6-C10	C6-C10 (F1 minus BTEX)	C10-C16	C10-C16 (F2 minus Naphthalene)	C16-C34	C34-C40	C10-C40 (Sum of total)	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(a) pyrene TEQ (medium bound)	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Vic EPA List)	C6-C9	C10-C14	C15-C28	C29-C36	C10-C36 (Sum of total)
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR	0.2	0.5	0.5	0.5	0.5	0.5	10	10	50	50	100	100	50	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	10	50	100	100	50
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand 0-1m	0.5	160	55			40		45		110																		3								
NEPM 2013 Table 1A(3) Soil Saturation Concentration (Csat), Clay	430	630	68			330		850		560																		10								
NEPM 2013 Table 1A(3) Soil Saturation Concentration (Csat), Silt	440	640	69			330		910		570																		10								
NEPM 2013 Table 1A(3) Soil Saturation Concentration (Csat), Sand	360	560	64			300		950		560																		9								
NEPM 2013 Table 1B(7) Management Limits Comm / Ind, Fine Soil							800		1,000		5,000	10,000																								
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Fine Soil							800		1,000		3,500	10,000																								
NEPM 2013 Table 1B(5) Generic EIL - Urban Res & Public Open Space																												170								
NEPM 2013 Table 1B(6) ESLs for Urban Res, Fine Soil 0-2m	50	85	50	105		45												0.7																		
NEPM 2013 Table 1A(1) HILs Res A Soil																			3												300					
CRC Care ESL- Urb Res & Public Open Space																		33																		
CRC Care Direct Contact HSL-A Residential (Low Density)	100	14,000	4,500			12,000	4,400		3,300		4,500	6,300																1,400								

Sample Code	Field ID	Date	Depth	Soil Type	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	C6-C10	C6-C10 (F1 minus BTEX)	C10-C16	C10-C16 (F2 minus Naphthalene)	C16-C34	C34-C40	C10-C40 (Sum of total)	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(a) pyrene TEQ (medium bound)	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Vic EPA List)	C6-C9	C10-C14	C15-C28	C29-C36	C10-C36 (Sum of total)
M21-Ja25676	**BH01/0.1**	**22/1/21**	**0.1**	**Silty gravelly sand**	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	<50	1100	720	1820	<0.5	<0.5	<0.5	3.8	3.4	5.1	3.3	1.8	2.8	4.3	0.5	6.8	<0.5	1.4	<0.5	2.5	6.8	37.4	<20	<20	480	990	1470
M21-Ja25678	**BH02/0.4**	**22/1/21**	**0.4**	**sandy gravelly silt**	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	<50	430	280	710	<0.5	0.6	0.8	<0.5	5.1	5.5	4.1	2.4	3.7	5.3	<0.5	8.8	<0.5	2.9	<0.5	2.7	8.5	50.7	<20	<20	250	270	520
M21-Ja25683	**BH03/0.1**	**22/1/21**	**0.1**	**sandy grravelly silt**	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	<50	290	<100	290	<0.5	<0.5	0.7	3.9	3.8	7.1	3.6	2.4	3.8	3.1	<0.5	7.4	<0.5	2.6	<0.5	2.8	7.3	41.4	<20	<20	190	160	350
M21-Ja25685	**BH04/0.5**	**22/1/21**	**0.5**	**clay**	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	<50	<100	<100	<100	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<20	<50	<50	<50
Statistics																																								
Number of Detects					**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**2**	**3**	**0**	**1**	**2**	**2**	**3**	**4**	**3**	**3**	**3**	**3**	**1**	**3**	**0**	**3**	**0**	**3**	**3**	**3**	**0**	**0**	**3**	**3**	**3**
Maximum Detect					**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1100**	**720**	**1820**	**0**	**0.6**	**0.8**	**3.9**	**5.1**	**7.10**	**4.1**	**2.4**	**3.8**	**5.3**	**0.5**	**8.8**	**0**	**2.9**	**0**	**2.8**	**8.5**	**50.7**	**0**	**0**	**480**	**990**	**1470**
Median Concentration *					**0.1**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**5**	**5**	**25**	**25**	**50**	**50**	**25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**5.30**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**5**	**25**	**50**	**50**	**25**
Standard Deviation *					**0**	**0**	**0**	**0**	**0**	**0**	**95**	**95**	**412**	**412**	**326**	**0**	**755**	**0**	**0**	**0**	**0**	**0**	**2.79**	**0**	**0**	**0**	**0**	**0**	**0**	**0.21**	**0**	**0**	**0.71**	**0**	**0.71**	**73**	**302**	**461**	**0**	**779**
95% UCL (Student's-t) *					**0.1**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**85.28**	**85.28**	**401.2**	**401.2**	**352.8**	**50**	**722.1**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**7.31**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.429**	**0.25**	**0.25**	**0.851**	**0.25**	**0.851**	**66.87**	**297.5**	**478.2**	**50**	**743.3**

ND = Non-detect

* A Non Detect Multiplier of 0.5 has been applied.

Shaded concentration results are indicative of an exceedance of the above criteria (shaded the same colour) from the Environmental Standards.

Environmental Standards

National Environmental Protection Council (NEPC) (2013). National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended April 2013) (NEPM 2013).
CRC CARE (2011). Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater.

LOR = Limit of reporting.
TEQ = Toxic equivalent quotient (the sum of each PAH species concenctration multiplied by its PAH species toxic equivalence factor (TEF)). See NEPM 2013 Table 1A(1).

TEMPLATE INFORMATION	
Last Changed:	1-7-21
Version:	2.0
Edits by:	TL
Changes:	Inserted Version Stamp

2. Soil VOCs and Phenols

					VOCs			OCP								PCB	Phenols											
					Vinyl Chloride	Total MAH	Sum of VOCs	DDT+DDE+DDD	Aldrin and dieldrin	Total Chlordanes	Endosulfan	Endrin	Heptachlor	HCB	Methoxychlor	Toxaphene	Total Polychlorinated Biphenyls	3&4-Methylphenol (m&p-cresol)	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2,6-Dichlorophenol	2-Chlorophenol	2-Methylphenol	2-Nitrophenol	4-chloro-3-methylphenol	Pentachlorophenol	Phenol
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR					0.5	0.5	0.5	0.05	0.05	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	2	0.5
NEPM 2013 Table 1B(5) Generic EIL - Urban Res & Public Open Space								180																				
NEPM 2013 Table 1A(1) HILs Res A Soil					0.3			260	7	50	300	10	7	10	400	20	1											100	3,000
Sample Code	**Field ID**	**Date**	**Depth**	**Soil Type**																									
M21-Ja25676	**BH01/0.1**	**22/1/21**	**0.1**	**Silty gravelly sand**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M21-Ja25678	**BH02/0.4**	**22/1/21**	**0.4**	**sandy gravelly silt**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M21-Ja25683	**BH03/0.1**	**22/1/21**	**0.1**	**sandy grravelly silt**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M21-Ja25685	**BH04/0.5**	**22/1/21**	**0.5**	**clay**	<0.5	<0.5	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5
Statistics																													
Number of Detects					**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Maximum Detect					**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
Median Concentration *					**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.5**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.5**	**0.5**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**1**	**0.25**
Standard Deviation *					**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
95% UCL (Student's-t) *					**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.5**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.5**	**0.5**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**1**	**0.25**

* A Non Detect Multiplier of 0.5 has been applied.

ND = Non-detect

Shaded concentration results are indicative of an exceedance of the above criteria (shaded the same colour) from the Environmental Standards.

Environmental Standards

National Environmental Protection Council (NEPC) (2013). National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended April 2013) (NEPM 2013).

LOR = Limit of reporting.

3. Soil Metals

					Metals											
					Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Tin	Zinc
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR					2	0.4	5	5	5	0.1	5	5	2	2	10	5
NEPM 2013 Table 1B(5) Generic EIL - Urban Res & Public Open Space					100		190	60	1100*			40				125
NEPM 2013 Table 1A(1) HILs Res A Soil					100	20	100	6,000	300	40		400				7,400
Sample Code	**Field ID**	**Date**	**Depth**	**Soil Type**												
M21-Ja25676	**BH01/0.1**	**22/1/21**	**0.1**	**Silty gravelly sand**	8	<0.4	64	40	560	0.5	-	35	-	-	-	370
M21-Ja25678	**BH02/0.4**	**22/1/21**	**0.4**	**sandy gravelly silt**	5.3	<0.4	25	31	420	1.4	-	33	-	-	-	290
M21-Ja25683	**BH03/0.1**	**22/1/21**	**0.1**	**sandy grravelly silt**	6.1	<0.4	25	33	220	0.4	-	17	-	-	-	310
M21-Ja25685	**BH04/0.5**	**22/1/21**	**0.5**	**clay**	3.4	<0.4	63	11	29	<0.1	<0.5	27	<2	<2	<10	86
Statistics																
Number of Detects					**4**	**0**	**4**	**4**	**4**	**3**	**0**	**4**	**0**	**0**	**0**	**4**
Maximum Detect					**8**	**ND**	**64**	**40**	**560**	**1.4**	**ND**	**35**	**ND**	**ND**	**ND**	**370**
Median Concentration *					**2.5**	**0.5**	**2**	**2.5**	**14**	**0.05**	**0.25**	**1**	**1**	**1**	**5**	**6**
Standard Deviation *					**0**	**0**	**0.79**	**0**	**2.9**	**0.045**	**0**	**0**	**0**	**0**	**0**	**7.6**
95% UCL (Student's-t) *					**2.5**	**0.5**	**2.702**	**2.5**	**15.78**	**0.0884**	**0**	**1**	**0**	**0**	**0**	**12.77**

* A Non Detect Multiplier of 0.5 has been applied.

*Lead EIL generic value is only Added Contamination Limit.

Shaded concentration results are indicative of an exceedance of the above criteria (shaded the same colour) from the Environmental Standards.

Environmental Standards
National Environmental Protection Council (NEPC) (2013). National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended April 2013) (NEPM 2013).

LOR = Limit of reporting.

4. Cyanide, Fluoride, pH and Asbestos

					NA	Fluoride	Cyanide	pH	
					Moisture Content	Total Fluoride	Total Cyanide	potential Hydrogen	Asbestos (AS4964)
					%	mg/kg	mg/kg	pH Unit	Comment
LOR					1	100	1	-	-
NEPM 2013 Table 1B(5) Generic EIL - Urban Res & Public Open Space									
NEPM 2013 Table 1A(1) HILs Res A Soil							250		
Sample Code	**Field ID**	**Date**	**Depth**	**Soil Type**					
M21-Ja25676	**BH01/0.1**	**22/1/21**	**0.1**	**Silty gravelly sand**	19	-	-	-	NAD
M21-Ja25678	**BH02/0.4**	**22/1/21**	**0.4**	**sandy gravelly silt**	4.2	-	-	-	NAD
M21-Ja25683	**BH03/0.1**	**22/1/21**	**0.1**	**sandy grravelly silt**	15	-	-	-	NAD
M21-Ja25685	**BH04/0.5**	**22/1/21**	**0.5**	**clay**	20	<100	<5	6.6	-
Statistics									
Number of Detects					**4**	**0**	**0**	**1**	**0**
Maximum Detect					**20**	**ND**	**ND**	**6.6**	**ND**
Median Concentration *					**16.7**	**50**	**2.5**	**6.6**	**6**
Standard Deviation *					**4.6**	**0**	**0**	**0**	**7.6**
95% UCL (Student's-t) *					**21.4**	**50**	**2.5**	**0**	**12.77**

ND = Non-detect

NAD = No Asbestos Detected

* A Non Detect Multiplier of 0.5 has been applied.

*Lead EIL generic value is only Added Contamination Limit.
Shaded concentration results are indicative of an exceedance of the above criteria (shaded the same colour) from the Environmental Standards.

Environmental Standards
National Environmental Protection Council (NEPC) (2013). National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended April 2013) (NEPM 2013).

LOR = Limit of reporting.

5. Field Blanks Soil

				BTEX						TRH		PAH	TPH
				Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	C6-C10	C6-C10 (F1 minus BTEX)	Naphthalene	C6-C9
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
			LOR	0.001	0.001	0.001	0.002	0.001	0.003	0.02	0.02	0.01	0.02
Sample Code	**Field ID**	**Sample Type**	**Date**										
M21-Ja25680	**RB01**	**Rinsate**	**1/22/2021**	<0.001	<0.001	<0.001	<0.002	<0.001	<0.003	<0.02	<0.02	<0.01	<0.02
M21-Ja25681	**TB01**	**Trip Blank**	**1/22/2021**	<0.001	<0.001	<0.001	<0.002	<0.001	<0.003	<0.02	<0.02	<0.01	<0.02

Notes: Detected concentrations are shaded red.

6. Field Duplicates Soil

			BTEX						TRH			TPH	Metals								PAH																	
			Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	C6-C10	C6-C10 (F1 minus BTEX)	Naphthalene	C6-C9	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Vic EPA List)
Lab ID	Field ID	Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		Eurofins LOR	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.3*	*20*	*20*	*0.5*	*20*	*2*	*0.4*	*5*	*5*	*5*	*0.1*	*5*	*5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
		Eurofins LOR	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.3*	*20*	*20*	*0.5*	*20*	*2*	*0.4*	*5*	*5*	*5*	*0.1*	*5*	*5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
EB1920992002	**BH01/3.8**	**09/08/19**	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<10	<0.5	<10	8	<0.4	64	40	560	0.5	35	370	<0.5	<0.5	<0.5	3.8	3.4	3.3	1.8	2.8	4.3	0.5	6.8	<0.5	1.4	<0.5	2.5	6.8	37.4
M21-Ja25686	**QS01**	**22/01/21**	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<10	<1	<10	4.5	<0.4	46	46	590	0.7	34	470	<0.5	<0.5	<0.5	3.3	2.8	2.5	1.8	2.2	4	<0.5	7.4	<0.5	0.9	<0.5	2.7	7.6	35.2
	Largest concentration multiplier of minimum LOR		*1*	*3*	*3*	*1*	*3*	*1*	*0*	*0*	*1*	*0*	*4*	*1*	*13*	*9*	*118*	*7*	*7*	*94*	*1*	*1*	*1*	*8*	*7*	*7*	*4*	*6*	*9*	*1*	*15*	*1*	*3*	*1*	*5*	*15*	*75*
		RPD	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**<5xLOR**	**0.00%**	**32.73%**	**13.95%**	**5.22%**	**33.33%**	**2.90%**	**23.81%**	**0.00%**	**0.00%**	**0.00%**	**14.08%**	**19.35%**	**27.59%**	**<5xLOR**	**24.00%**	**7.23%**	**<5xLOR**	**8.45%**	**0.00%**	**<5xLOR**	**0.00%**	**7.69%**	**11.11%**	**6.06%**

Notes: Where values are less than LOR, 50% of LOR is used for the RPD calculation.
** Elevated RPDs are highlighted as per QAQC profile settings (i.e. > 30%), however it is noted that AS4482.1 states that for organic compounds 50% may be acceptable.
***Interlab duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those use in the primary laboratory
RPD = relative percent diference.

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